Steube, A. (2004) (ed.) Information Structure: Theoretical and empirical aspects. DeGruyter, 277 - 306

Carla Umbach, Ina Mleinek, Christine Lehmann, Thomas Weskott, Kai Alter, and Anita Steube

Intonational Patterns in Contrast and Concession

1 Introduction

This paper details an experimental study dealing with the interaction between the use of the German *aber* and specific intonational sentence patterns. It is the second in a series of experimental investigations into the interaction of intonation and meaning conducted by the project "Intonation and Meaning" which is a subproject of the Leipzig Linguistic Research Group.[1]

This study is part of the general investigation of contrast in information structure and discourse structure, which is one of the major topics of the research group. It is widely held that the notion of contrast plays an important role in both information structure and discourse structure. In the field of information structure, we have to distinguish contrastive focus from presentational or informational focus, and we have to account for the specific properties of contrastive topics as opposed to ordinary ones. In discourse structure, contrast interacts with various discourse relations signalled by all kinds of discourse markers.

In the Leipzig Linguistic Research Group, the notion of contrast has been discussed from the point of view of syntax, semantics and prosody, taking Slavic languages (Russian, Polish, Slovakian, Czech) into account in addition to German (see the articles in Steube & Umbach 2001 and in Steube 2002). The topics of research included, among others, the intonational differences between contrast and correction in Polish and Slovakian (Adamíková & Fehrmann 2001), the intonation of correction in German (Steube 2001a), the characteristics of the "hat-contour" pattern in German and in Russian (Steube 2001b, Mehlhorn 2001), and the influence of intonation on the interpretation of the German contrastive conjunction *aber* (Umbach 2001, to appear).

The study reported in this paper addresses the question of whether the contrastive (adversative)[2] use and the concessive use of German *aber* are distinguished by intonation. In Lang (2001) it has been claimed that the

---

[1] funded by the Deutsche Forschungsgemeinschaft (DFG)

[2] The term *contrastive* and the term *adversative*, which is common in the German literature, are used synonymously in this paper.

contrastive use and the concessive use of German *aber* correspond to different intonation patterns. According to Lang, in the contrastive use the topic given by the preceding context is elaborated in a symmetric way. Therefore, each conjunct of the *aber*-sentence comprises a contrastive topic and a focus. As compared to this, in the concessive use the topic is elaborated in an asymmetric way where the second conjunct is fully focussed. Different from Lang's hypothesis, the focus-based account of *but*/*aber* in Umbach (2001)/(to appear) does not couple contrast and concession with symmetry and asymmetry of elaboration. However, similar to Lang (2001), it predicts an intonational difference relating to the way of elaboration. Still, it is an open question whether this difference is reflected in the data.

The aim of the present study is to set out the connection between the theoretical considerations and our experimental approach in an exemplary fashion. In the experiment to be discussed below, subjects were presented sentences that were embedded into contexts which varied with respect to the interpretation of the *aber*-construction, i.e. contrastive vs. concessive. Subjects were asked to read the sentences aloud, and their productions were recorded and subject to a phonological and statistical analysis. Since this study is the first that investigated the issue of the contrastive vs. concessive reading in German from an empirical perspective, it has a rather exploratory character. Our main concern is to establish the type and number of factors that may influence the prosodic realisation of the two interpretations alluded to above.

The paper is organized as follows: Section 2 deals with the theoretical background and presents the hypotheses that guided the phonological analysis of the data. In section 3, the sentence material, the experimental procedure and the phonological properties of the data will be described in detail. In section 4, a descriptive statistical analysis is given which is followed by a discussion. Finally, section 5 presents our conclusions and points to some issues that have to be accounted for in further research.

2 Theoretical Background

It is well known that German *aber*-sentences as well as English *but*-sentences allow for a concessive interpretation. In the concessive interpretation, a concessive marker, e.g., German *trotzdem* or English *nevertheless*, may be added without affecting the meaning of the sentence. Consider, for example, (1)(a) and (b):

(1) (a) Es regnete, aber Ben ging spazieren.
(It was raining, but Ben went for a walk.)
(b) Es regnete, aber Ben ging trotzdem spazieren.
(It was raining, but Ben went for a walk nevertheless.)

In her seminal paper in (1971) Lakoff distinguished between a semantic opposition use of *but* (*John is tall but Bill is short*) and a denial-of-expectation use (*John is tall but he's no good at basketball*). In the recent literature it is commonly held that the contrast expressed by *but*/*aber* results from a denial-of-expectation, the first conjunct triggering an expectation which is refuted by an inference from the second conjunct (cf., e.g., Lang 1984, Winter & Rimon 1994, Grote et al. 1997, Braußе 1998). The expectation is given by some kind of defeasible rule licensed by contextual or world knowledge. Concessive interpretations are regarded as a special case, where it is not an inference from the second conjunct but the second conjunct itself, which leads to a contradiction, compare (2)(a) and (b).

(2) (a) contrastive
"P *but* Q": $(P \rightarrow_D \neg R)$ & $(Q \rightarrow R)$
expectation: "Normally, P implies not-R"
(b) concessive
"P *but* Q [*nevertheless*]: $(P \rightarrow_D \neg Q)$ & Q
expectation: "Normally, P implies not-Q"

The examples in (3) and (4) demonstrate the inferences involved in the contrastive and the concessive use according to the standard approach.. In (3), hardly any context allows for a concessive interpretation (you may, however, imagine a situation where restaurants are advised to be open as long as there is a hungry person in town). The expectation triggered by the first conjunct will be the one in (3)(b) contradicting the inference resulting from the second conjunct, cf. (3)(c).[3] In (4), as compared to (3), the expectation resulting from the first conjunct directly contradicts the proposition in the second conjunct.

(3) contrastive
(a) We are hungry but the restaurants are closed.
(b) Normally, if we are hungry there is some food available.
(c) Restaurants are closed, so there is no food available.

(4) concessive
(a) It was raining, but Ben went for a walk [nevertheless].
(b) Normally, if it is raining, people don't go for a walk.
(c) Ben went for a walk.

[3] Note that, if we assume the expectation to be "Normally, if we are hungry, there is some restaurant open.", it would directly refute the proposition in the second conjunct, thus complying with the concessive schema in (2)(b). Hence the schema would predict a concessive reading although it is excluded by the context.

In the remainder of this section we will first present the hypothesis in Lang (2001), then outline the focus-based analysis in Umbach (2001, to appear), and finally compare the predictations made by these accounts.

2.1 Lang's Hypothesis

According to the standard account sketched above, the contrastive reading and the concessive reading of a *but/aber*-sentence are seperated by the general context (background knowledge, knowledge inferred from the previous discourse etc.) Contrary to this, Lang (2001) claims that, (at least) in German, these readings are primarily separated by prosodic means. The context has to be in accordance with the prosodic marking, in particular, the immediately preceding discourse has to be such that it licences the specific intonation contour. This hypothesis is demonstrated by the example in (5):

(5) (a) contrastive
A: Was machen denn deine Eltern?
(So how are your parents?)
B: Es geht ihnen unterschiedlich:
(Different things:)
L*H L*H H% L L*H H*L L%
[[[Mein VAter/]$_T$[ist ernsthaft KRANK/]$_F$ ^{IP}] [[aber] [meine MUtter/]$_T$[geht ARbeiten\]$_F$ ^{IP}] ^{U}]
(My father is sick but my mom is going to work.)

(b) concessive
A: Was machen denn deine Eltern?
(So how are your parents?)
B: Ich bin entsetzt:
(I'm really annoyed:)
L*H L*H H H* H*L L%
[[Mein VAter/]$_T$ [ist ernsthaft KRANK/]$_F$ [aber meine MUtter geht ARbeiten\]$_F$ ^{U}]
(My father is sick, but my mom is going to work.)

Lang's hypothesis is based on his theory of coordination (cf. Lang 1984, 2002), which, in short, requires conjuncts to be parallel with respect to syntax, semantics, and prosody. Syntactic parallelism accounts for various well-formedness requirements. Semantic parallelism imposes two conditions: first, coordinated elements have to be semantically independent, neither of them subsuming the other, and secondly, there has to be a "common integrator", i.e. a concept subsuming both conjuncts. This is demonstrated in (6): In (a) semantic independence is violated because the meaning of *Tiere* subsumes the meaning of *Elefanten*. Therefore, (6)(a) will be infelicitous unless the hearer

takes elephants to be a kind of animals not included in ordinary animals. In (b) the need for a common integrator leads to the interpretation of *Bank* as being a bench, excluding the interpretation as a financial organisation.

(6) (a) ?? Hans malt gerne Tiere und Elefanten.
(Hans likes to draw animals and elephants.)
(b) Hans hat einen Tisch und Peter hat eine Bank.
(Hans owns a table and Peter owns a bench.)

Note that the effects demonstrated in (6) also occur when we consider the alternatives evoked by focus, e.g. *??Hans malt nur Tiere, keine Elefanten*. Obviously, the alternatives constituting the domain of *only* have to comply with both semantic independence and the common integrator requirement. Actually, Lang's coordination conditions seem to be genuine conditions on alternatives, applying to coordination because coordinated elements constitute mutual alternatives.

Parallelism of the conjuncts is also required with respect to intonation, i.e. conjuncts should have the same topic-focus structure. It is possible, however, to induce non-parallel topic-focus structures in the conjuncts overwriting, in return, semantic and syntactic parallelism constraints. This accounts for the difference in (5)(a) and (b). (For detailed predictions about the prosodic structure cf. Section 3). In (5)(a) the sentence constitutes a symmetric elaboration of the discourse topic "the parents", first elaborating on one part of the topic ("my father") and then elaborating on the other part ("my mother"). Accordingly, each conjunct contains a contrastive topic and a VP-wide focus. In (5)(b), in contrast, the sentence constitutes an asymmetric elaboration where the conjuncts in combination give the reason for B's annoyance. Thus it is assumed that B's annoyance provides the discourse topic (and Common Integrator). Asymmetry of elaboration is reflected by the fact that the second conjunct is fully focussed.

Lang's hypothesis about the contrastive and the concessive reading of *aber*-sentences is as follows: The contrastive reading of an *aber*-sentence presupposes parallelism of conjuncts, thus inducing symmetric discourse elaboration. The concessive reading presupposes non-parallel conjuncts inducing asymmetric elaboration. Although following the standard account in assuming that a contrast expresses a denial of expectation, Lang's hypothesis proposes a different way to distinguish between the contrastive and the concessive reading. Instead of attributing the distinction to the context of use, it is primarily attributed to intonation, and instead of employing different inference patterns (where one is a special case of the other), different (non-overlapping) types of discourse elaboration are employed.

2.2 Concessive "over-interpretation"

In Umbach (2001)/(to appear) a focus-based account of the semantics and pragmatics of *but/aber* is presented which differs from the standard accounts because it is not based on the denial-of-expectation idea. Instead, it starts from two novel observations: (i) *but/aber* is similar to focus-sensitive operators such as *only,* because the contrast evoked by *but/aber* relates to the alternatives evoked by the focus, and (ii) any *but/aber*-sentence has to comprise a confirmation and a denial with respect to an implicit question referring to the alternatives under discussion. The latter is called "denial condition". It is demonstrated in (7): If the question is answered by confirming (or denying) both conjuncts, the use of *but* is not acceptable. If, however, one part of the question is confirmed and the other part denied, the use of *but* is perfect (and the use of *and* would be marked).

(7) Adam: Did John clean up his room and wash the dishes?
Ben: (a) # [yes], John cleaned up his room, but [yes] he washed the dishes.
(b) [yes], John cleaned up his room, but [no] he didn't wash the dishes.

Taking focus-sensitivity and the denial condition into account, the use of *but* imposes two conditions which can be outlined as follows: By using *but* an alternative is added to the set of alternatives under discussion, as in the case of *and* and *also*. However, unlike *and* and *also,* this alternative will result in a false proposition when combined with the common background, therefore requiring negation. Note that the denial condition must not be misunderstood as introducing a negation. Instead, *but* imposes an exhaustive reading on the first conjunct, similar to the adverb *only*. The affinity between *but* and *also/only* has been pointed out by Sæbø (2002). Adapting his terminology, the meaning of *but*/*aber* can be characterized as being "anti-additive", comprising both additivity and exclusion. Exclusion is trivial, if the second conjunct is explicitly negated. But it may also be given by entailment.

On the focus-based account, *but*/*aber*-sentences are classified as either "simple contrast" or "double contrast". Simple contrast cases involve one pair of alternatives, either individuals, or predicates, or propositions, cf. (8)(a)-(c).[4] The double contrast cases include two pairs of alternatives, which may occur parallel or crossed, cf. (9)(a), (b). In the simple contrast cases negation will either be explicit or be reconstructed by predicate negation (note that in the case of individual alternatives negation is obligatory, since individuals cannot be negated). In the double contrast cases negation comes as an entailment. (9)(a), for example, clearly entails that John did not wash the dishes.

[4] The intonation patterns may be more complex, cf. Umbach (to appear).

(8) simple contrast
  (a) predicates: John cleaned up the \ROOM, but he didn't wash the \DISHES.
  (b) individuals: \JOHN cleaned up the room, but \BILL didn't.
  (c) propositions: It is \RAINING, but we are not going to stay at \HOME.

(9) double contrast
  (a) parallel: /JOHN cleaned up the \ROOM, but /BILL did the \DISHES.
  (b) crossed: /JOHN cleaned up the \ROOM, but it was \BILL who did the /DISHES.

This analysis differs from standard accounts of *but*/*aber* in that there is no recourse to a previously given hearer expectation which is denied by the use of *but/aber*. Instead, it is assumed that any sentence is linked to the preceding discourse by an explicit or implicit question, which in the case of *but/aber* has to be partly confirmed and partly denied. On the other hand, it is well-known that negated sentences have a general tendency to trigger the expectation that the corresponding affirmative proposition holds (cf. Givón 1978). Given the denial condition, *but*/*aber*-sentences include an (explicit or implicit) negation, thereby triggering the expectation that both alternatives hold simultaneously. Thus the idea that there is an expectation denied by the use of *but/aber* is finally confirmed. However, contrary to the standard account, the expectation is due to the general implicature of negation.

The focus-based account facilitates a clear separation of contrast and of concession. Following König (1991), concession is interpreted as incausality: "P *although* Q" iff "not (not-P *because* Q)", cf. (10):

(10)(a) Bill is rich although he lost a lot of money.
  (b) It is not the case that ((Bill is not rich) because (he lost a lot of money)).

It is commonly known that, although the semantic meaning of *and* is a mere conjunction, *and*-sentences are often interpreted in a causal manner. For example, (11)(a) may be read as (11)(b). However, interpreting the conjunction *and* as a causal relation is clearly a case of over-interpretation, not included in the meaning of *and*.

(11)(a) It is raining and Mary is happy.
  (b) It is raining and Mary is happy because of that.

Similarly, a *but*-conjunction as in (12)(a) may be interpreted as a concession. However, as in the case of *and*, this interpretation is not licensed by the meaning of *but*, which is a plain conjunction (plus the Denial Condition). Instead, this interpretation is induced by causal over-interpretation, too. However, in the case of *but* there is an inherent negation. For this reason, causal over-interpretation of *but* results in incausality, i.e. concession. This is

demonstrated by the example in (12): In (b), according to the Denial Condition, the negation is reconstructed. In (c) the conjunction is supplemented with a causal relation which combines with the negation resulting in incausality, i.e. a concessive relation. Hence causal overinterpretation of (12)(a) results in (d).

(12) (a) It is raining but Mary is happy.
(b) It is raining but it is not the case that Mary is not happy.
(c) It is raining but it is not the case that Mary is not happy because of that.
(d) It is raining but Mary is happy in spite of that.

According to this analysis, there is no "concessive *but*", just as there is no "causal *and*". The meaning of *but* does not include incausality, just as the meaning of *and* does not include causality. At the same time, *but* is perfectly compatible with a concessive connective, just as *and* is compatible with a causal connective.

2.3 Comparison

The analyses in Lang (2001) and Umbach (to appear) differ considerably in their view of the concessive use of *but*/*aber*. According to the former, a concession is a special case of denial-of-expectation, where the expectation directly contradicts with the proposition stated in the second conjunct. According to the latter, it results from causal overinterpretation of the contrast. At the same time, both analyses assume that the information structure of the sentences has to respond to the topic set in the preceding discourse. Let us consider Lang's prototypical example in (5), repeated in (13). Lang's distinction between symmetric and asymmetric *but/aber*-sentences coincides to some degree with the distinction of simple contrast and double contrast made in the focus-based account. In (13)(a), assuming that the discourse topic to be elaborated is given by the parents, we expect a double contrast. In (13)(b), if the topic is provided by B' annoyance, we expect a simple contrast involving propositional alternatives. Thus the information structures predicted by the focus-based account roughly agree with Lang's prediction: The double contrast case in (13)(a) requires contrastive topics, whereas the simple contrast propositional case in (b) requires sentence-wide focus for at least one of the conjuncts.[5] So both accounts do predict similar intonation contours for (a) and (b), respectively.

[5] To be more precise, the focus-based account predicts that the second conjunct of (13)(b) is fully rhematic, which excludes a separate theme/topic, but allows for background material within the rheme.

(13) A: Was machen denn deine Eltern?
(So how are your parents?)
(a) contrastive – symmetric – double contrast
B: Es geht ihnen unterschiedlich:
(Different things:)
Mein /VATER ist \KRANK, aber meine /MUTTER geht \ARBEITEN.
(My father is sick but my mom is going to work.)
(b) concessive – asymmetric – simple contrast
B: Ich bin entsetzt:
(I'm really annoyed:)
[Mein Vater ist \KRANK]$_F$ aber [meine Mutter geht \ARBEITEN]$_F$.
(My father is sick, but my mom is going to work.)

However, in contrast to Lang's hypothesis, the focus-based account does not predict, that asymmetric, i.e simple contrast proposition cases must be interpreted as a concession. Since the concessive interpretation of *aber/but*-sentences is regarded as over-interpretation, it may or may not be induced by the context, independent of the respective information structure. Actually, (14) demonstrates a simple contrast proposition case where world knowledge precludes a concessive reading. Furthermore, on the focus-based account even symmetric, i.e. double contrast cases may be (over-)interpreted as a concession. The example in (15) shows a double contrast case which, according to the context, suggests a concessive reading.

(14) Kommissar: Ihr Mann kam also um fünf nach Hause und da lag ein Paket im Flur?
(detective: So your husband came home at five and there was a package lying in the hall?)
Zeugin: Mein Mann ist um fünf nach Hause gekommen, aber der Flur war [#trotzdem] leer.
(witness: My husband came home at five but the hall was empty [#nevertheless].)

(15) (context: Hanna loves to accompany her brother when he is feeding the animals.)
A: Was machen die Kinder?
(What are the children doing?)
B: /Anton füttert die Tiere, aber /Hanna ist [trotzdem] zu ihrer Freundin gegangen.
(Antony is feeding the animals but Hanna is staying with her girlfriend [nevertheless].)

To conclude: Whereas according to Lang's hypothesis symmetricity is coupled with adversativity and asymmetricity with concessivity, respectively, the focus-based account admits concessive readings in any of these cases. Still, both Lang (2001) and Umbach (to appear) predict that symmetric/double contrast cases such as (13)(a) and asymmetric/simple contrast cases such as (13)(b) differ in intonation.

3 Phonological analysis

The study presented in this paper aimed first and foremost at the verification of Lang's (2001) hypothesis that the contrastive/adversative and the concessive use of German *aber* are distinguished by prosodic means. It was set up according to the clear predictions concerning the intonational patterns in Lang (2001) and is rather explorative, our main concern being to establish the type and number of influencing factors. The study consists in a speech production task and provides acoustic analyses and a perceptual evaluation. In addition, there are post-hoc interviews verifying the intended readings.

3.1 Contexts and Target Sentences

In composing the contexts and target sentences, we closely followed Lang's original example (see section 2.1, examples 5a/b), which is also part of our corpus. In addition, we included four other target sentences. However, one of the items had to be removed afterwards, because it turned out that the subjects had difficulties to find a consistent interpretation (see section 3.3). The target sentences were integrated in an adversative and a concessive context, thus we finally worked with eight contexts similar to the one discussed in section 2.1 (see examples 5). One of the items is shown below:

(16) Context: Wie verstehst du dich mit deiner neuen Mitbewohnerin?
(How do you get along with your new room-mate?)

(a) adversative: Wir sind sehr verschieden:
(We differ in several respects.)
Target: Ich gehe früh schlafen, aber sie hört bis in die Nacht Musik.
(I usually go to sleep very early, but she listens to music until midnight.)

(b) concessive: Ich bin ziemlich genervt:
(I'm really annoyed:)
Target: Ich gehe früh schlafen, aber sie hört bis in die Nacht Musik.
(I usually go to sleep very early, but she listens to music until midnight.)

We investigated the question of whether the difference between the versions are acoustically encoded, i.e. result in different intonational patterns. Lang provides a number of clear predictions of the prosodic features of the adversative and the concessive reading spelled out within the ToBI system, see example (5a/b). Below, the ToBi annotations in (5a/b) have been carried over the example in (16):

Adversative version:

L*H L*H H% L L*H H*L L%

[[ICH/]$_T$ [gehe früh SCHLAfen/]$_F^{IP}$] [[aber] [SIE/]$_T$ [hört bis in die Nacht MuSIK\]$_F^{IP}$]^U].

Concessive version:

L*H L*H H H* H*L L%

[[ICH/]$_T$ [gehe früh SCHLAfen/]$_F$ [aber sie hört bis in die Nacht MuSIK\]$_F^U$].

The ToBI labelling focusses on at least five relevant intonational differences (i-iii, v) between the adversative and the concessive readings, (cf. Table 1). The crucial predictions can be summarised as follows: The difference in the intonational patterns is located around the boundary between the two conjuncts in both readings. The first three points account for the boundary itself (iii) and the temporally right adjacent pitch, i.e. the tonal distribution on the connector (ii) and on the first lexical items in the second conjunct (i). In considering point (iv), it is unclear whether an optional deletion of the connector is due to phonological deletion rules or related to optional lexical. Point (v) deals with possible intonational phrasing properties which might be related to the patterns proposed in (iii). The question of whether this is a result of the difference between the adversative and the concessive realisations is left open.

	Difference points	Adversative version	Concessive version
(i)	Pitch accent in the beginning of the second conjunct	L*H	H*
(ii)	(lexical) tone of the connector	L	H
(iii)	IP boundary tone at the end of the first conjunct	H%	?
(iv)	Status of the connector	optional	obligatory
(v)	Delimitation of IP	conjunct wise	sentence wise

Table 1: Intonational patterns supposed to differentiate between adversative and concessive readings following Lang (2001: 125)

Based on these assumptions, we conducted a speech production study investigating the intonational parameters (i-iii). In addition to the acoustic analysis of the local pitch contour, the investigation included perceptive evaluations and the statistical analysis of the acoustic.

In the following sections, the experimental design (3.2), the acoustic and proto-typical intonational patterns and the perceptional observations are presented, (3.3). Finally, we briefly discuss the results of the post-hoc interviews, cf. (3.4).

3.2 Experimental Design

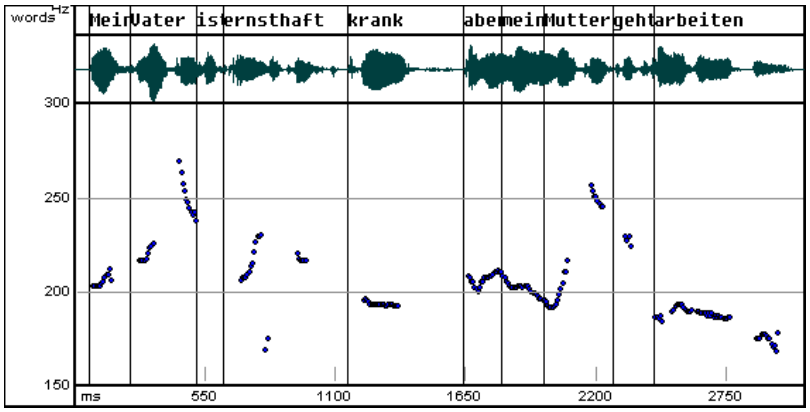
Eleven female native German speakers were asked to read the 2x4 contexts. Thus, the corpus of the production study resulted in 88 target sentences (44 for each condition). After recording, the speakers were asked how they understood the examples and what exactly the difference between the respective adversative and the concessive variants was.

The contexts including the target sentences were recorded and digitised with a DAT-recorder at 16bit/44.1kHz sampling rate. The target sentences were cut out of the contexts by means of Cool Edit and acoustically and prosodically analyzed using WinPitch and PitchWorks.

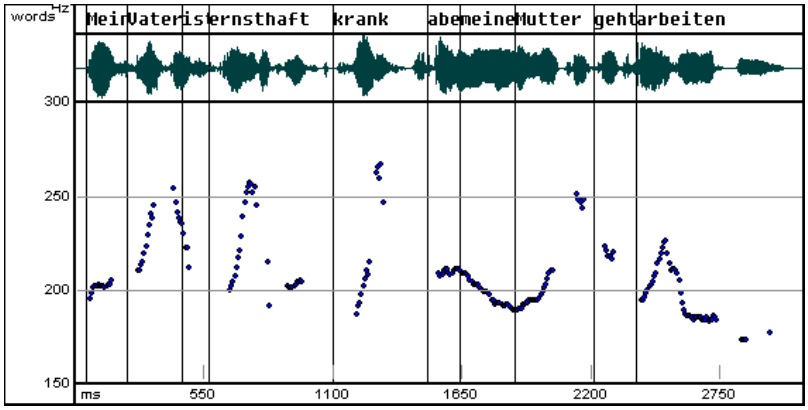
3.3 Acoustic analyses

First, we looked at the labelled F0-contours of three subjects out of eleven in PitchWorks. They did not show systematic patterns which would suggest a prosodic disambiguation of the readings. For example, the decisive word *krank* in Lang's original example (example 5 in section 2) shows falling and rising patterns. These patterns are neither consistent for the conditions nor for the speakers. They even cancel each other out. This is demonstrated below:

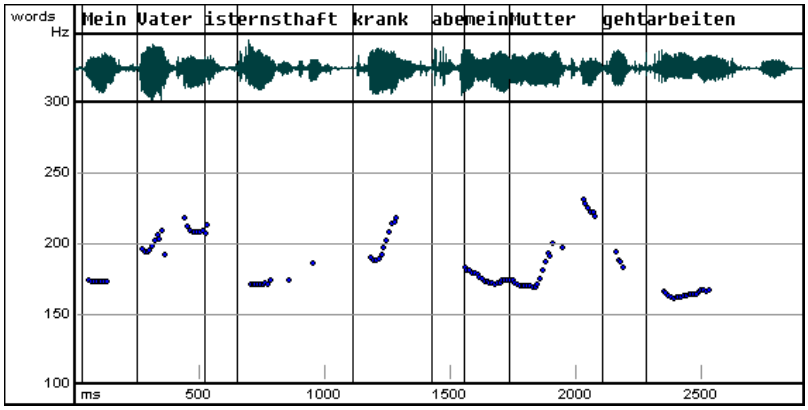
subject 1/ adversative condition (Translation see example (5) a / b)



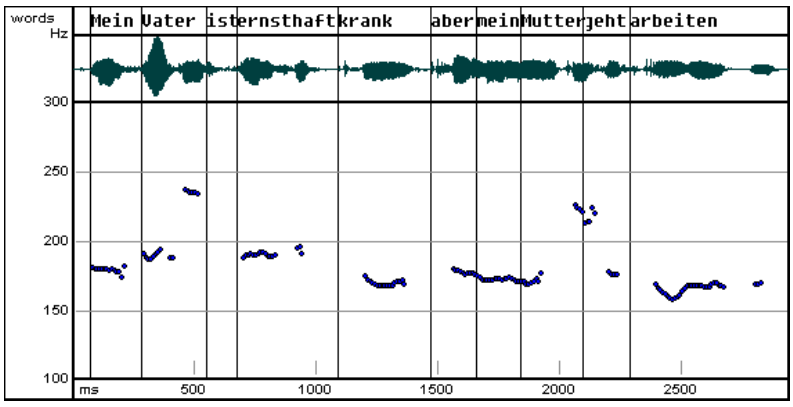
subject 1/ concessive condition



subject 2/ adversative condition



subject 2/ concessive condition



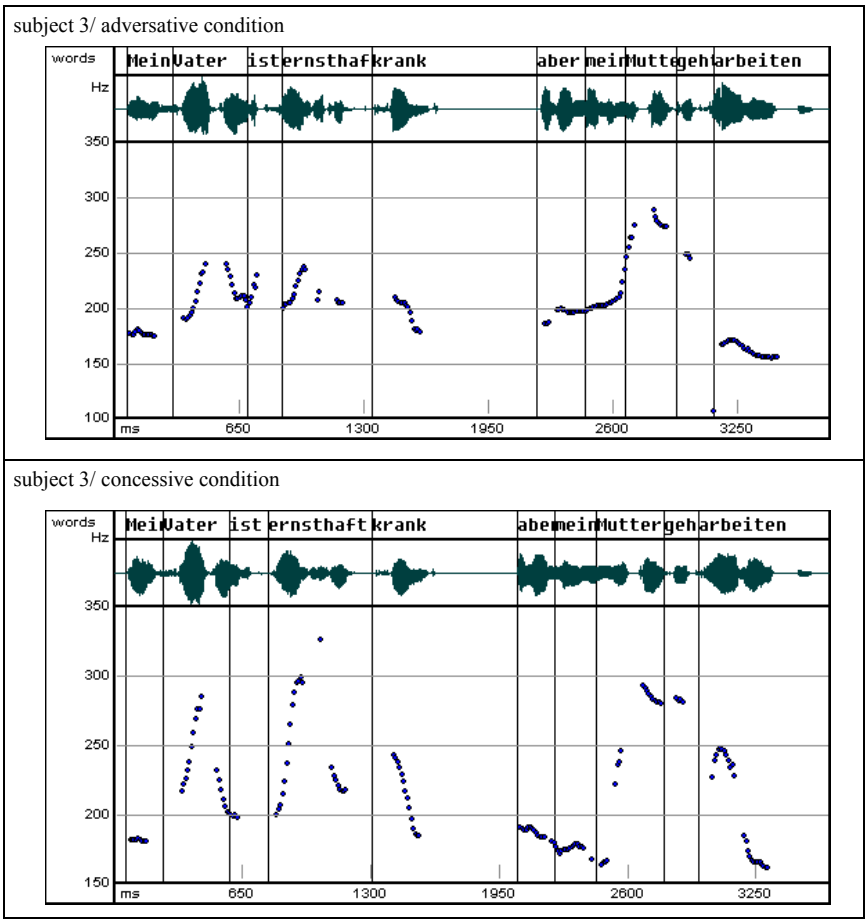


Figure 1: Single F0-contours for Lang's example in both versions

From these contours no tendency or thesis can be derived. They are even partly contradictory. At this point of the analysis, we had to take the possibility into account that there might be no correlation at all between the signal and the reading. For this reason, the target sentences of the 11 female speakers were perceptually evaluated.

We found that 9 out of 11 (female) speakers were mostly able to encode the semantic difference in a prosodic way. We noticed, however, there was one item where the speakers obviously failed encode the semantic difference prosodically. Thus we were not able to assign the prosodic signal to one of the two versions. This item was removed from our corpus.

We now tried to assign prosodic parameters to the semantic conditions. That was possible for 7 out of 11 (female) subjects. Judging from perceptive

evaluation, these subjects use the same strategies, for example: rise of the fundamental frequency immediately before the phrase boundary in condition (a) or its fall in condition (b); greater stress on the sentence topic in the second conjunct in condition (b); the F0-contour on the focus of the second conjunct in condition (b) no longer fell for some speakers; finally, there are differences in the behaviour for pauses. However, it is unclear in what way and to what degree these perceptible distinctions are relevant for the distinction of the two versions.

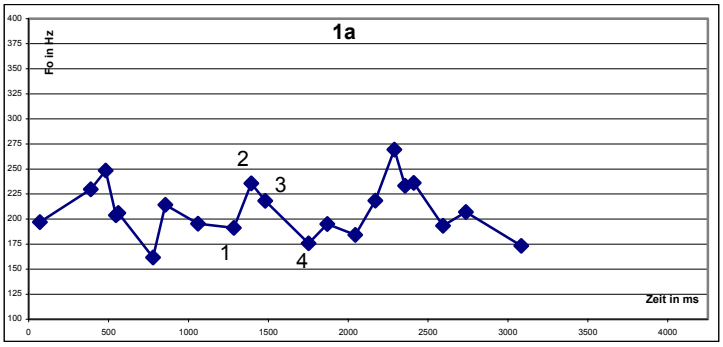
With the help of the perceptual evaluation, we defined measurable parameters which could serve as correlates for differences between the versions. Actually, these parameters are closely connected to Lang's hypothesis. They include:

1. the direction of the pitch movement prior to the focus accent of the first conjunct = Onset of the focused word
2. the accent itself = Peak of the accented syllable
3. the boundary = Offset of the focussed word
4. the onset of the connector *aber*

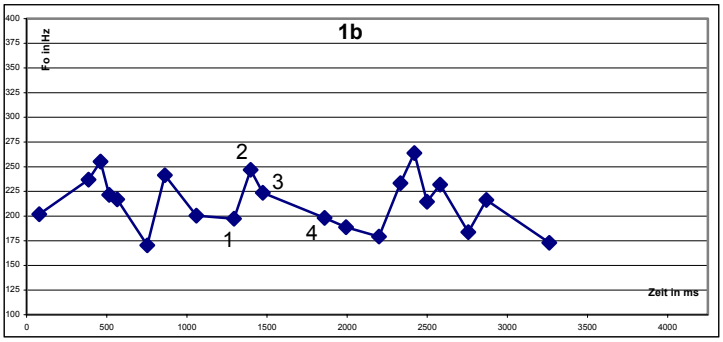
For further analysis, we focussed on 4 items produced by the 7 (female) speakers who apparently behaved consistently. Thus we had 56 target sentences (28 sentences in each condition) for further prosodic observations and for statistic comparisons.

We defined suitable measuring points in F0 and corresponding time values (depending on the sentence length between 19 and 28 per target sentence) covering the whole contour as exactly as possible. Then we determined the mean average values of these measuring points. This is shown below by the prototypical F0-contours for all 4 items (the numbering in the signal reflects the above defined parameters 1 to 4; the accented syllable of the focused word in the first conjunct is marked by capital letters):

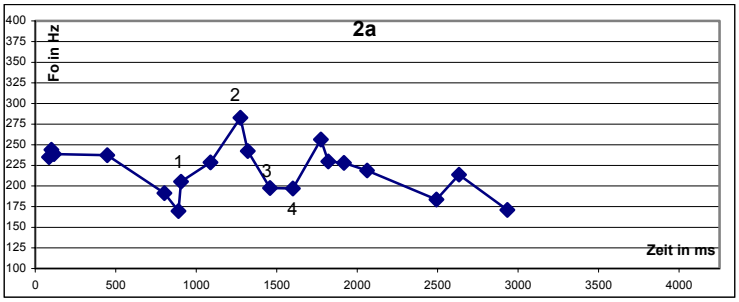
1 (a) (C) Was machen denn deine Eltern?
(So how are your parents?)
Es geht ihnen unterschiedlich.
(Different things:)
Mein Vater ist ernsthaft KRANK, aber meine Mutter geht arbeiten.
(My father is sick, but my mom is going to work.)



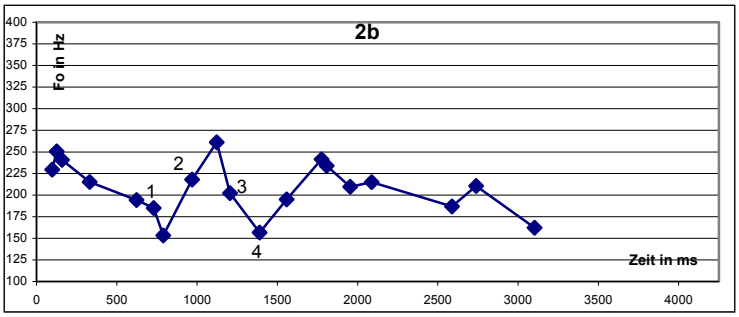
1 (b) (C) Was machen denn deine Eltern?
(So how are your parents?)
Ich bin ziemlich entsetzt.
(I'm really annoyed:)
Mein Vater ist ernsthaft KRANK, aber meine Mutter geht arbeiten.
(My father is sick, but my mom is going to work.)



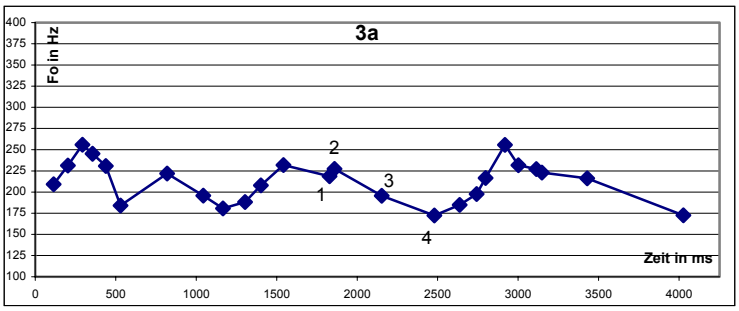
2 (a) (C) Wie verstehst du dich mit deiner neuen Mitbewohnerin?
(How do you get along with your new room-mate?)
Wir sind sehr verschieden.
(We differ in several respects.)
Ich gehe früh SCHLAfen, aber sie hört bis in die Nacht Musik.
(I usually go to sleep very early, but she listens to music until midnight.)



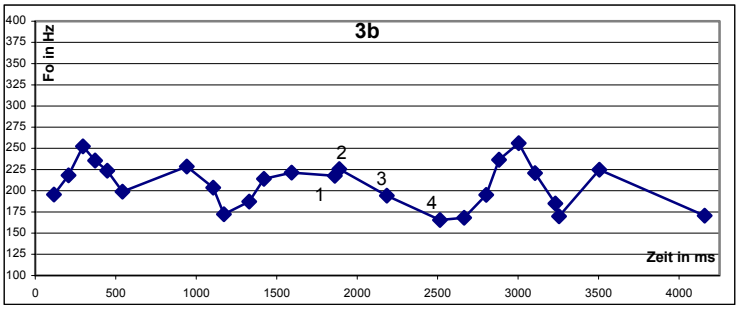
2 (b) (C) Wie verstehst du dich mit deiner neuen Mitbewohnerin?
(How do you get along with your new room-mate?)
Ich bin ziemlich genervt.
(I'm really annoyed:)
Ich gehe früh SCHLAfen, aber sie hört bis in die Nacht Musik.
(I usually go to sleep very early, but she listens to music until midnight.)



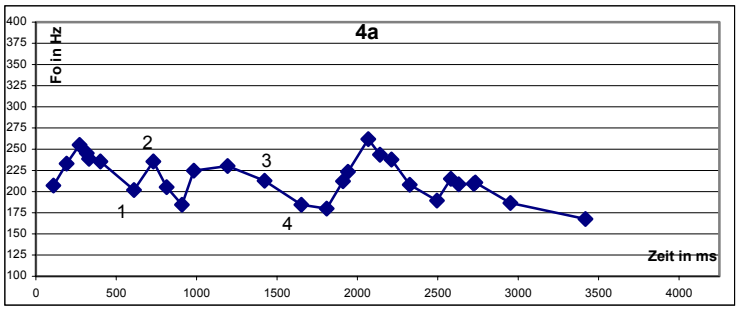
3 (a) (C) Was machen denn die Kinder gerade?
(What are the children doing at the moment?)
Paula hat in 2 Wochen eine wichtige PRÜfung, aber Peter will in Urlaub fahren.
(Paula has an important exam in two weeks, but Peter wants to go on vacation.)



3 (b) (C) Warum streiten sich die beiden denn?
(Why do they argue?)
Paula hat in 2 Wochen eine wichtige PRÜfung, aber Peter will in Urlaub fahren.
(Paula has an important exam in two weeks, but Peter wants to go on vacation



4 (a) (C) Was machen denn Peter und Paul dieses Wochenende?
(What do Peter and Paul do this weekend?)
Paul hat FREUNde eingeladen, aber Peter fährt zu einem Fußballspiel.
(Paul has invited friends, but Peter will go to a soccer game.)



4 (b) (C) Warum ist sie denn enttäuscht?
Why is she disappointed
Paul hat FREUNde eingeladen, aber Peter fährt zu einem Fußballspiel.
(Paul has invited friends, but Peter will go to a soccer game.)

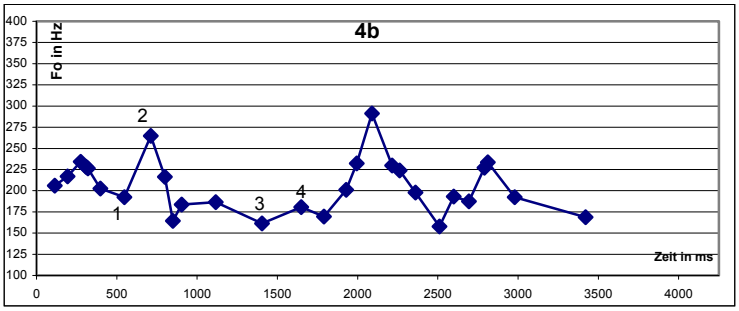


Figure 2: Prototypical F0-contours for all 4 items in both versions (a and b). The diagrams show the realisation of the time wave form (upper level) and the pitch contour (lower level). (a) stands for the adversative readings and (b) for the concessive readings.

Based on the perceptual evaluation, we expected an intonational difference between the concessive and the adversative target sentences. However, an explorative comparison of the F0-contours per condition did not reveal any systematic difference. In figure (1) in the first row, Lang's original example (cf. example 5) is presented for the two different conditions. The visual

examination of the proto-typical F0-contours shows close similarity within one item and also within the versions. This applies to the other items as well. The only divergence to be seen appeared in the concessive reading of item 4. This leads to the conclusion that the thesis of Lang, which says that the semantic difference between the adversative and the concessive version correlates with a prosodic difference (at least in German), cannot be verified.

Finally, we conducted a combined inspection of both the auditory signals and the accompanying F0-contours. Based on the auditory evaluation we found some examples matching with the hypothesis in section 2. In single cases some speakers realised the hypothesized prosodic differentiation between the two readings, indicating a certain tendency for an opposition between versions: In five comparisons, we detected a clear high boundary in the adversative version, thus marking a difference between both readings (cf. parameter (iii) in Table 1). However, in at least three cases we also found the exact reversed realisation. Other correlates like the direction of tonal movement (cf. parameter 2 mentioned above) show similar distributions. The number of clearly distinguished examples revealed by this method is 11 of a total of 56, which equals random distributions.

No profound empirical conclusion can be drawn from these observations. A clear distinction based on both auditory evaluation and visual inspection of F0-contours, which is a prerequisite for prosodic analysis, does not reach confidence level.

However, in a more detailed statistical analysis, points (iii) and (iv) in the signal (the boundary and the connector) were evaluated for seven speakers and 4x2 items. We tried to find out whether at least these points, for which Lang made clear predictions (see ToBI annotation of examples (5a,b), and parameters (ii) & (iii) in Table 1), would show statistically relevant distinctions. The statistical analysis is described in section four.

3.4 Post-hoc interviews

In addition to the production task, we conducted post-hoc interviews aiming at the question of whether the subjects acknowledge the intended semantic difference between the versions and how they interpret the difference. Through the interviews we wanted to make shure that the presented triggered the intended readings. The interviews confirmed that, in each of the presented items, there is a clear semantic difference. Moreover, the subjects agreed to a high degree in their description of the contexts. The adversative variants were characterized as neutral, unbiased, less contrastive; conjuncts appear to be loosely connected. In contrast, the concessive variants were characterized as emotional, biased, containing an implizit reproach, highly contrastive; conjuncts appear to be closely connected. Three subjects actually suggested to

insert *obwohl (although)* or *trotzdem (nevertheless)* into some of the concessive contexts.

From the interviews we learned that the failure in finding prosodic differences between the readings cannot be the result of inadequate test material. As mentioned in the beginning of this section, there was one item which was judged as being unclear. But this item had been removed from the data.

Still, the characterization of the concessive variant as being emotional or biased was surprising. According to Lang (2001), both the contrastive/adversative and the concessive reading of an *aber*-sentence express a denial of expectation, the difference consisting in the respective inference pattern (cf. section 2.1). According to the focus-based account in Umbach (to appear), the concessive reading results from an (in-)causal interpretation of the conjunction (cf. 2.2). Although this is a clear semantic distinction, it does not explain the characterization of the concessive contexts as being emotional. It may be argued that the concessive contexts unintentionally resemble Lang's original example, which is emotional. In any case, the question of how a concession is interpreted seems to be an interesting topic for further research.

4 Descriptive Statistical Analysis

A descriptive *post-hoc* analysis was performed on these data which took Lang's (2001) hypothesis as a heuristic. That is, we looked for a point in the sound signal where the two conditions of the items should clearly differ if that hypothesis was correct. Before turning to that analysis, however, a methodological remark is in place.

The exploratory analysis essentially hinges on two reliability conditions concerning the data patterns which do not seem to be fulfilled trivially by data stemming from this kind of production experiment. Note that these two conditions are independent from the hypothesis in question; they must be satisfied in order to relate the data to the hypothesis in the first place.

First of all, it has to be assumed that subjects exhibit a consistent behavior with respect to the distinctions at hand, independently of how that behavior relates to the hypothesis. This is to say that a given speaker should exhibit a behavior that is consistent *across* items, i.e. she should reliably produce a prosodic pattern in the adversative condition and the concessive condition,

respectively, and that this pattern should be found in more or less all the items in the respective conditions.[6]

Secondly, one has to assume that speakers from a given sample do not differ essentially in the manner in which they encode the respective readings – again, independently of how that encoding fits with the hypothesis. This assumption predicts a given sample of speakers to reliably encode e.g. the adversative reading more or less in the same fashion, and the concessive reading more or less in the same fashion, too (*modulo* the personal characteristics of the speakers), irrespective of whether these fashions are the same or different for the conditions.

4.1 Results

With these two reliability requirements in mind, the data were screened and subjected to an exploratory descriptive analysis. We chose to analyze the region of the connective, since it was the element that reappeared in all 4 items in all conditions. This warranted the comparability of the F_0-values. Furthermore, this is the region where one would expect the conditions to differ considerably (s. section 2 above). The data consisted of the F_0-value for the offset of the last syllable of the first conjunct, and the F_0-value for the onset of the connective ”aber”. Table 2 shows the descriptive data for the F_0-values for the offset of the first conjunct in both conditions; condition 0 is the adversative, condition 1 the concessive interpretation. The rows show the performance of the 7 subjects on the items by condition successively; the columns show the scores for the 4 different items. The first reliability assumption made above should result in an approximately consistent pattern of data in the respective rows. The second assumption would predict that every second value in the columns should center around some mean value.

---

[6] This in turn depends on intra-personal consistency, i.e. that a speaker, when reading an item in one condition repeatedly, follows the same strategy in both prosodic realizations, yielding more or less the same behavioral pattern, i.e. producing similar F_0 scores. Since this assumption was not tested here, nothing can be said in favor of it, nor against it. Note that this condition on reliability (called "test-retest reliability" in test theory, i.e. the relationship between the scores that a person achieves when doing the same test twice) is tacitly assumed to be satisfied in most (psycho-)linguistic experimental studies because the sources of (intra-personal) variance are taken to be accidental, i.e. not ascribable to any systematic influence. We follow this assumption here and suppose that variance will decrease with higher test power, e.g. by testing more subjects.

		item					
subject	cond.	1	2	3	4	means	std.dev.
1	0	191	178	180	181	182.50	5.80
	1	254	244	182	117	199.25	63.41
2	0	209	265	161	181	204.00	45.18
	1	217	196	160	156	182.25	29.33
3	0	240	237	178	232	221.75	29.35
	1	211	228	181	163	195.75	29.23
4	0	212	130	203	233	194.50	44.80
	1	175	115	166	181	159.25	30.14
5	0	171	235	152	159	179.25	37.99
	1	172	220	160	160	178.00	28.57
6	0	323	370	324	320	334.25	23.89
	1	247	126	182	174	182.25	49.75
7	0	182	282	171	183	204.50	51.95
	1	289	286	329	179	270.75	64.23
means	0	218.29	242.43	195.57	212.71		
	1	223.57	202.14	194.29	161.43		
std.dev.	0	51.41	76.62	58.87	54.88		
	1	42.77	62.18	60.25	21.82		

Table 2: F_0-values for the offset of the 1st conjunct

However, as a thorough look at Table 2 reveals, the data exhibit a huge degree of variance *both* across items *and* subjects. Take for example the performance of subject 1 for item 1 (the first two data rows of Table 1), where the F_0-value for condition 1 clearly falls below that of condition 0; a similar pattern is obtained for item 2. But the performance for the two conditions of item 3 do not show any difference. And for item 4, there is a difference between the values, but it points in the opposite direction when compared to that of items 1 and 2. And the same inconsistency across items can be found in nearly all subjects, with the notable exception of subject 6, which is the only subject exhibiting a consistent pattern across items. Also note that the means across both subjects and items show a vastly inconsistent picture, which of course carries over to the relation between the two conditions. To give but one more example: if we consider the first data column of Table 2, we find all possible patterns for the data patterning over the two conditions of item 1 across the subjects: *condition (0)* < *condition (1)* (subjects 1, 2, and 7), *condition (0)* > *condition (1)* (subjects 3, 4 and 6), and *condition (0)* ≈ *condition (1)* (subject 5); the means of the two conditions however are nearly identical (μ (cond 0) = 218.29; μ (cond 1) = 223.57), and conceal this highly unsystematic variance. Even if we take standard deviation as an indicator of variance for the performance of a subject or item, we do not seem to get a similar patterning

across items and/or subjects. This indicates that the patterning across items (the rows) does not reappear across subjects, which would be expected if it had been certain properties of the single items that influenced the subjects to produce a particular prosodic difference between the conditions with one item, but not with the other. One might suspect that the reason for the huge variance of the F_0-values between both subjects and items as witnessed by the standard deviation values has to be sought in the fact that the dependent variable in question belonged to different items which contained different lexical material, i.e. the offset of the first conjunct consisted of different lexical material. However, if we turn to the values for the onset of the connective ”aber”, we face the same diagnosis, as Table 3 reveals.

		item					
subject	cond.	1	2	3	4	means	std.dev.
1	0	204	191	145	199	184.75	27.04
	1	212	110	201	173	174.00	45.72
2	0	188	209	148	181	181.50	25.30
	1	189	152	145	149	158.75	20.73
3	0	100	194	206	154	163.50	47.82
	1	214	191	213	222	210.00	13.29
4	0	104	130	196	198	157.00	47.40
	1	175	115	105	176	142.75	38.04
5	0	193	198	152	159	175.50	23.36
	1	190	206	128	175	174.75	26.81
6	0	251	259	209	202	230.25	28.91
	1	209	115	180	185	172.25	40.21
7	0	191	201	150	198	185.00	23.71
	1	198	207	186	184	193.75	10.78
means	0	175.86	197.43	172.29	184.43		
	1	198.14	156.57	165.43	180.57		
std.dev.	0	54.81	37.72	29.69	20.30		
	1	14.42	44.38	40.07	21.81		

Table 3: F_0-values for the onset of the connective "aber":

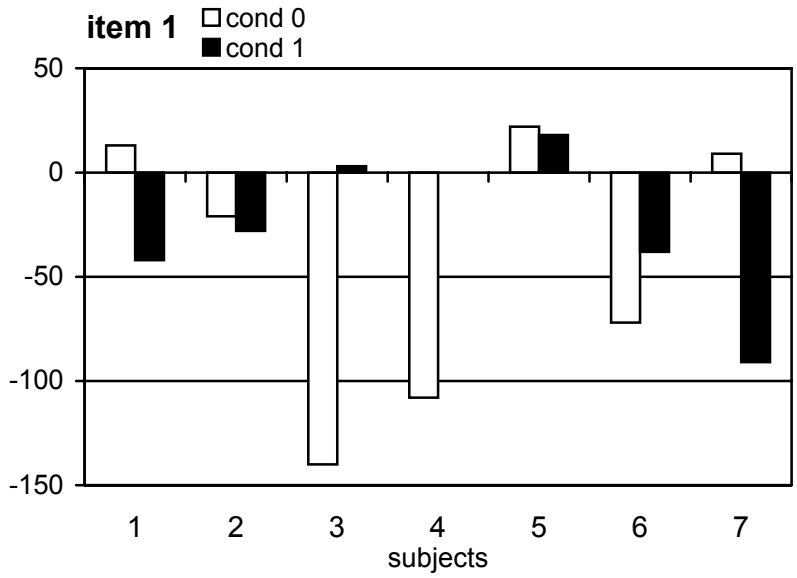
Here we also found the F_0-values to vary dramatically across both items and subjects, as the standard deviation values reveal. Although the lexical material was the very same (i.e., the /a/ of ”aber”), which should warrant a certain degree of uniformity of encoding, it was prosodically realized in a massively heterogeneous manner. Again, the only subject performing consistently across items was subject 6. No consistent pattern across subjects could be found for any of the items.

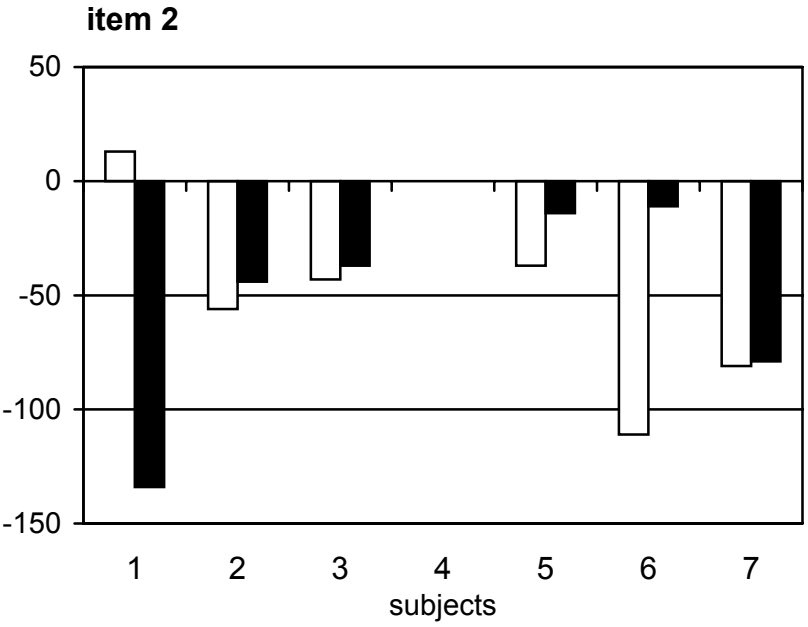
If we finally look at the difference between the two values – a measure which should mirror the tonal movement between the two points in the sound string – the inconsistent picture found in the tables above, unsurprisingly, carries over to Table 4. The values are the result of subtracting the F_0-values from Table 2 (those measured at the offset of the last constituent of the first conjunct) from those in Table 3 (those measured at the onset of the connective). That is, a positive value stands for a rising tonal movement between the two points, whereas a negative represents a fall.

		item					
subject	cond.	1	2	3	4	means	Std.dev.
1	0	13	13	-35	18	2.25	24.94
	1	-42	-134	19	56	-25.25	83.00
2	0	-21	-56	-13	0	-22.50	23.95
	1	-28	-44	-15	-7	-23.50	16.18
3	0	-140	-43	28	-78	-58.25	70.11
	1	3	-37	32	59	14.25	41.11
4	0	-108	0	-7	-35	-37.50	49.37
	1	0	0	-61	-5	-16.50	29.76
5	0	22	-37	0	0	-3.75	24.47
	1	18	-14	-32	15	-3.25	23.99
6	0	-72	-111	-115	-118	-104.00	21.52
	1	-38	-11	-2	11	-10.00	20.74
7	0	9	-81	-21	15	-19.50	43.92
	1	-91	-79	-143	5	-77.00	61.32
means	0	-42.43	-45.00	-23.29	-28.29		
	1	-25.42	-45.57	-28.86	19.14		
std.dev.	0	64.58	43.26	44.90	51.93		
	1	36.70	47.05	59.13	27.38		

Table 4: Difference between the F_0-values for the onset of "aber" and the offset of the 1st conjunct:

Comparing the subjects (rows) and items (columns) yields the by-now familiar picture: neither did subjects encode the concessive and adversative reading reliably across items (apart from subject 6, who quite consistently produced a fall in both conditions, but one that was about a half smaller in condition 1), nor did the patterns obtained from different speakers show any kind of recurrent structure. We have to conclude that the variance between items *and* between subjects was so huge that the reliability assumptions that we formulated as preconditions for testing Lang's hypothesis are simply not satisfied by the data we collected. Figure 3 illustrates this finding graphically.


item 1
cond 0
cond 1
50
0
-50
-100
-150
1
2
3
4
5
6
7
subjects


item 2
50
0
-50
-100
-150
1
2
3
4
5
6
7
subjects

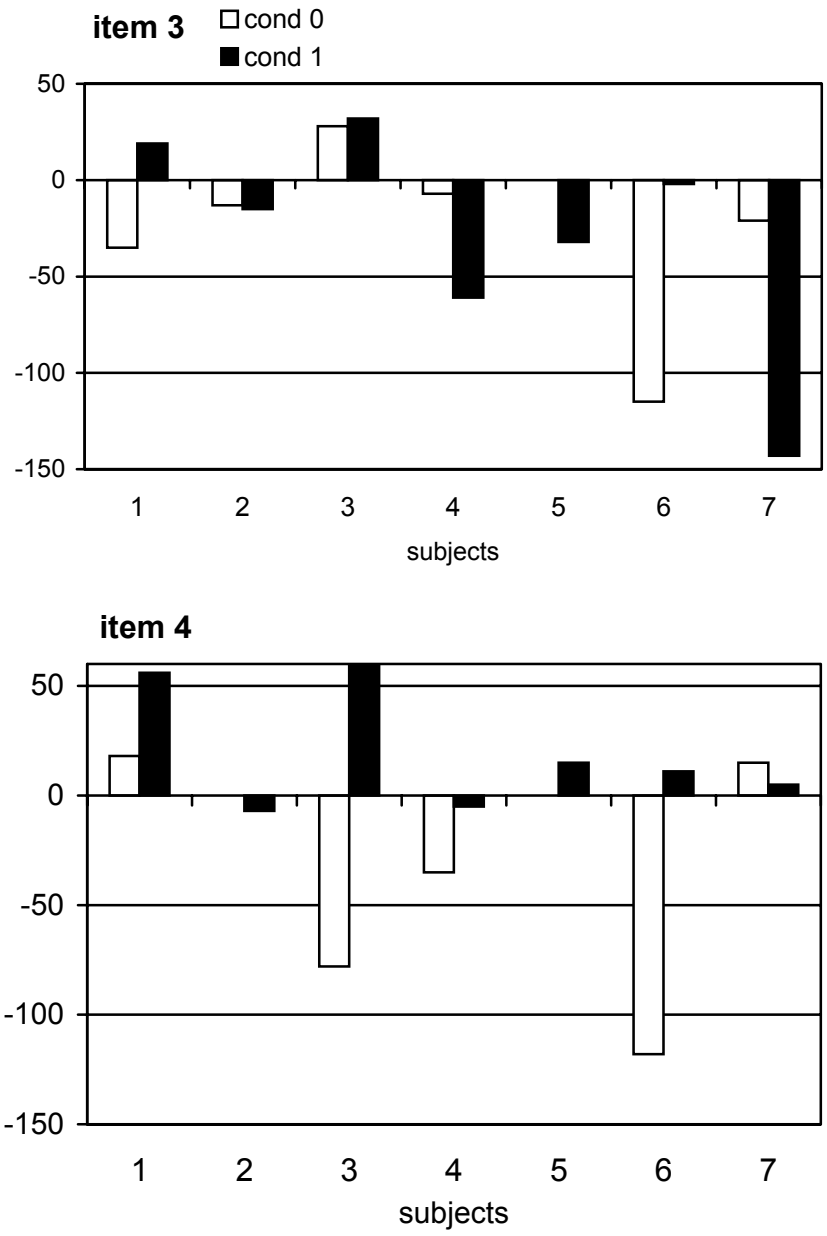


Figure 3: Differences between the F_0-values for the onset of "aber" and the offset of the 1st

4.2 Discussion

What is the reason for the variation our data showed? At the moment, we can only speculate about the answer to that question.

First of all, it may well be that the most basic reliability assumption mentioned in footnote 6 above may not be fulfilled in the present study, i.e. the assumption that there is an *intra*-personally reliable behavior underlying the prosodic realization of *any* sentence, i.e. a behavior that is consistent over time. This could e.g. be due to the fact that the concessive condition involved a good deal of emotional or evaluative attitude on part of the speakers, which of course may perhaps have varied over the course of the experiment. This explanation however would predict that the concessive conditions (cond 1) show a higher degree of variance than the contrastive ones (cond 0). This prediction however is not borne out by the data. Hence we may conclude that either there was a further factor influencing the consistency of performance, or, alternatively, that the variance exhibited by the performance in condition 1 infected the performance of condition 0.

A further source of variation may – as in most experiments – be sought in the sample of subjects that took part, and the size of that sample. That is, it is conceivable that there are samples of speakers which show a lesser degree of *inter*-personal variance, i.e. samples exhibiting a prosodic encoding that complies to the two conditions formulated above, and hence is more apt for putting Lang's hypothesis to test. For example, it may be possible to find more subjects like subject 6 by some independent criterion, although it is far from clear what such a criterion would have to consist in. But if we recall the fact that the data for the seven subjects reported above are a subset of our sample which was selected by the criterion of *percepted consistency of encoding* (s. section 3.3), this possibility is seriously cast into doubt. A final stance on this issue cannot be taken here, since it may be that a bigger sample (with say, N=30), together with a carefully balanced item set, may yield a less blurry and more conclusive picture.

This finally brings us to two further sources of the variation between items: the evaluative quality of the concessive readings, and the discourse structure underlying the four items investigated here.

The first point concerns the "affective load" that our subjects attributed to the concessive readings, i.e. the degree of indignation that they subjectively associated to that reading. It may well be that the emotional quality of this condition makes it highly susceptible to inter-personal variation of encoding. Not having controlled for this property systematically, we cannot preclude that it may have resulted in a larger variance.

A similar observation holds for the second point, the discourse structure of the texts that our subjects were presented. All of the items contained an elaborative relation between the target sentence and an elaborandum given by

the context. But the details of the elaboration relation are far from obvious. According to Lang (2001), the contrastive/adversative use of *aber* requires a symmetric elaboration, whereas the concessive use is based on an asymmetric one. This predicts in the case of item 1 that, in the contrastive condition, the two topics of the target conjunction ("My father ..., but my mother ...") elaborate the expression "your parents", establishing an elaborative relation between the discourse referent "parents" on the one hand, and "father" and "mother" on the other. In the concessive condition, it is assumed that the conjoined sentence elaborates on the fact that the speaker is annoyed ("Ich bin entsetzt"), thus establishing an elaboration relation between the speaker's annoyance and the reason he gives. However, as shown in section 2.2, the concessive reading need not correlate with an asymmetric elaboration, cf. example (15). It may therefore be argued that, in the concessive condition, speakers made use of either a symmetric or an asymmetric elaboration, which could explain the prosodic variation we found.

Note, moreover, that the items differ with respect to the type of elaborandum or "common integrator" provided by the context (cf. section 2). In item 1 and item 3 we find group antecedents ("the parents", "the children") to be elaborated by the topics of the conjuncts. Opposed to this, the elaborandum of item 2 is given explicitly: "you" and "your roommate". This means that the topics of the two conjuncts ("I" and "she") have explicit antecedents in the context that they can connect or bind to. Item 4 shows a structure deviating from the other ones: in condition 0, it features explicit antecedents for the topics ("Peter" and "Paula"), whereas in condition 1, there is no element that the topics of the conjuncts can relate to. It is clear from what was said so far that the factor "discourse structure" was not systematically controlled for in this study. However, if we assume for the sake of argument that it should exert some kind of influence on the prosodic realization, the data do not show any systematic pattern that would entitle us to conclude that discourse structure is a candidate for the source of variation, for the simple reason that the inter-individual variance prohibits drawing any conclusion pertaining to this issue.

To conclude: at first sight, the differences in prosodic realization associated to the different interpretations of *aber*-conjuncts seem a promising subject for straightforward empirical validation. But as we have argued, a study aiming at this difference faces a number of problems necessitating a more intricate design. Pointing to the relevant theoretical and methodological problems, the present study contributes to the intonational investigation of German *aber*-constructions and facilitates follow-up studies.

5 References

Adamíková, M. and D. Fehrmann (2001): Prosodische Differenzierung von Kontrast- und Korrekturkonstruktionen im Slovakischen und Polnischen. In: A. Steube and C. Umbach (eds), 81-112.

Braße, U. (1998): Was ist Adversativität? *ABER* oder *UND*. Deutsche Sprache 26 (2), 138-159.

Givón, T. (1978): Negation in Language: Pragmatics, Function, Ontology. In P. Cole (ed): Syntax and Semantics 9: Pragmatics. Academic Press, New York, 69-112.

Grote, B., N. Lenke, and M. Stede (1997): Ma(r)king Concessions in English and German. Discourse Processes 24, 87-117.

König, E. (1991): Concessive relations as the dual of causal relations. In: D. Zaefferer (ed): Semantic universals and universal semantics. Groningen-Amsterdam studies in semantics 12, Foris, 190-209.

Lakoff, R. (1971): If's, and's and but's about conjunction. In: C. Fillmore and D. Terence Langendoen (eds): Studies in linguistic semantics. de Gruyter, New York, 114-141.

Lang, E. (1984): The semantics of coordination. SLCS 9, Amsterdam, Benjamins.

Lang, E. (2001): Kontrastiv vs. implikativ: Interpretationseffekte intonatorischer Distinktionen bei Koordination. In: A. Steube and C. Umbach (eds), 113-138.

Lang, E. (2002): Kontrastiv vs. implikativ II: Interpretationseffekte einer intonatorischen Distinktion bei elliptischen Sprichwörtern. In: A. Steube (ed), 187-212.

Lang, E. and C. Umbach (2002): Kontrast in der Grammatik: spezifische Realisierungen und übergreifender Konnex. In: A. Steube (ed), 145-186.

Mehlhorn, G. (2001): Produktion und Perzeption von Hutkonturen im Deutschen. In: A. Steube and C. Umbach (eds), 31-57.

Sæbø, K. J. (2002): Presupposition and Contrast: German aber as a Topic Particle. Paper presented at the Sinn & Bedeutung 2002, Konstanz.

Sanders, T., W. Spooren, and L. Noordman (1992): Toward a Taxonomy of Coherence Relations. Discourse Processes 15, 1-35.

Steube, A. (2001a): Correction by Contrastive Focus. Theoretical Linguistics 27 (2/3).

Steube, A. (2001b): Grammatik und Pragmatik von Hutkonturen. In: A. Steube and C. Umbach (eds), 7-29.

Steube, A. (ed) (2002): Sprachtheoretische Grundlagen der Kognitionswissenschaft: Sprachliches und nichtsprachliches Wissen. Linguistische Arbeitsberichte 79, Leipzig.

Steube, A. and C. Umbach (eds) (2001): Kontrast - lexikalisch, semantisch, intonatorisch. Linguistische Arbeitsberichte 77, Leipzig.

Umbach, C. (2001): Contrast and Contrastive Topic. In: I. Kruijff-Korbayova and M. Steedman (eds): Proceedings of the ESSLLI 2001 Workshop on Information Structure, Discourse Structure and Discourse Semantics.

Umbach, C. (to appear): Contrast and Information Structure. Linguistics.

Winter, Y. and M. Rimon (1994): Contrast and Implication in Natural Language. Journal of Semantics 11, 365-406.