EXPERIMENTS ON THE MEANING OF TWO PITCH ACCENT TYPES: THE 'POINTED HAT' VERSUS THE ACCENT-LENDING FALL IN DUTCH[1]

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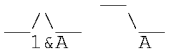
ABSTRACT

The aim of the present investigation is to find out more about the meaning of two Dutch melodic shapes: the default pitch accent or 'pointed hat' and the accent-lending fall. Can the meaning difference between these pitch configurations be better described as a difference in information status or as a difference in attitude? Subjects were presented with the two contours on short sentences in specific contexts; the stimulus formed either the answer to a question (the focused information is new) or the completion of an enumeration (the focused information was already projected). In a pairwise comparison test subjects had to choose the contour best fitting the presented context. In a rating experiment subjects judged each combination of contour type and context on a number of semantic scales. Information status as well as attitude explain part of the results, indicating that both notions should be incorporated in the semantics of intonation.

1. INTRODUCTION

The present experimental investigation is concerned with meaning differences between two Dutch accent-lending pitch configurations: the so-called pointed hat ('1&A') and the accent-lending fall ('A' in terms of the Grammar of Dutch Intonation, cf. [1]):



Intuitively, the two contours differ rather conspicuously in meaning, in spite of the shared meaning of *accent* ('this is important information', cf. [2,3]). The reported experiment is one in a series of attempts to verify theoretical propositions regarding the abstract meaning of Dutch melodic shapes in an experimental setting [4,5,6,7].

According to Keijsper's structuralistic analysis of the meaning of Dutch melodic shapes [2], the most neutral form of pitch accent is '1&A' (her 'type I'), which just means *accent*. Only in final position a further meaning aspect is added: final '1&A' marks focused information as new. In contrast, the accent-lending fall 'A' (her 'type III') indicates that the information was projected before the moment of speaking; it is not suitable for focusing unmistakably new information.

In Gussenhoven's autosegmental analysis of Dutch intonation [3,8,9], the two contours share the meaning of adding new information, since they are both instances of the H*L tone morpheme. However, the single fall is downstepped [10] and has a high onset instead of a (default) low onset: %H !H*L. A recent experiment [11] shows that a high onset followed by a high pitch accent (e.g. %H H*L or %H !H*L) sounds less favorable — less friendly, less polite, more irritated, and more aloof — than a low onset followed by a high pitch accent (e.g. %L H*L, or '1&A'). The effect of downstep is probably that 'A' sounds more final and more complete than '1&A' [10,12,13]. This means that within the autosegmental approach to Dutch intonation '1&A' and 'A' share the meaning of adding new information to the background,[2] but 'A' may sound more final and less favorable (e.g. more irritated) than '1&A'.

Our earlier experimental results [4,5,7] indicated that the pointed hat contour is suitable for focusing unpredictable as well as predictable information,[3] whereas the accent-lending fall is suitable only on utterances containing predictable information. Both Keijsper's and Gussenhoven's theoretical approaches can be reconciled with the general acceptability of '1&A', since any utterance which is worth making can be interpreted as adding new information to the background shared between speaker and listener. Keijsper's model offers a clear explanation for the more limited distribution of fall 'A', since this contour indicates that the focused information was already projected (which is not the case when the information is unpredictable). According to Gussenhoven both '1&A' and 'A' mark information as new, but 'A' sounds more irritated; assuming that it is not unusual for sentences containing predictable information to be uttered on an irritated 'tone', this analysis would provide an alternative explanation for the finding that the 'A' contour is acceptable only on the 'predictable' sentences.

The present experiment was set up to evaluate the relative suitability of the two models more formally, and learn more about the meaning of '1&A' and 'A'. Does 'A' signal unfavorable attitudes such as irritation, or is its meaning better described as 'this information was projected before the moment of speaking'? Or are both notions independently needed to account for the meaning difference between '1&A' and 'A'?

2. EXPERIMENTAL APPROACH

A dialogue-like approach is chosen, using speaker-turn chang-

es as points of departure, which proved a fruitful approach when investigating meaning differences between two other Dutch melodic shapes (i.e., '1Ø' and '12', cf. [6]). The stimulus utterance in the present investigation forms either *the end of an enumeration* — i.e., no speaker-turn has occurred and the focused information was projected by the same speaker before the moment of speaking — or it is *the answer to a question* — i.e. a speaker-turn has occurred immediately before. Preference judgments and acceptability scores will reveal the suitability of contours '1&A' and 'A' in both situations, and semantic scales will be used to measure the attitudes associated with the two contours. When Keijsper is right, the data should present a clear effect of context type, whereas Gussenhoven's analysis predicts no such effect.

The contexts were situated in a school setting, the speaker being the teacher. For example (translated into English):

- Together with a colleague you are visiting Amsterdam with a class. You have divided jobs and are meeting again for lunch. To the question of your colleague how things are going you answer: "Not too well, because the exhibition was disappointing, Jolanda was robbed, and ...": "*Marina is missing*".

This context 'projects' a further (and final) element in an enumeration of problems.

- You are visiting the Rijksmuseum with a number of pupils and a colleague. When leaving the museum you notice that a pupil is missing. You are busy finding out if other pupils know where she is as your colleague comes outside. On his question what is going on you answer: "*Marina is missing*".

The most likely interpretation of the target utterance in this context is that the focused information is presented as new (to the hearer).

For each of the two context types, four different versions were created, resulting in a total of eight different contexts.

2.1. Design and predictions

The investigation comprized two experiments. To avoid a direct influence of the pitch of the context preceding the target utterance, subjects were presented with only visual representations of the situational contexts.

In a pairwise comparison experiment subjects were presented with the two melodic versions of a target utterance in a specific context, and they had to select the contour best fitting the presented context. Starting from Keijsper's point of view the '1&A' contour should be preferred in the 'answer' contexts, and the 'A' contour in the 'enumeration' contexts, the preference in the latter context type probably being less clear, since the information contained in the last part of an enumeration may be interpreted as important and new, which would lead to a preference for '1&A'. Starting from Gussenhoven's analysis, the prediction would be that there is an overall preference for the more neutral '1&A' pitch accent, because the 'A' contour expresses a less favorable attitude.

In a rating experiment subjects were asked to judge each combination of context and contour type (using the same materials) on the following scales: acceptability, irritation and finality. 'Acceptability' is used as a complement to the pairwise comparison data; 'irritation' is one of the 'favorability' scales used in [11], and 'finality' is associated with downstep (cf. [10,12,13]). Within Keijsper's framework the acceptability scores are expected to reflect the pairwise comparison data; her analysis provides no self-evident predictions for the finality and irritation judgments. Gussenhoven's analysis leads to the following predictions: contour 'A' sounds more irritated, more final and less acceptable than contour '1&A', regardless of the context type presented.

2.2. Method

Stimulus materials. Two Dutch intonologists, a male and a female, realized the target utterances with each of the two intonation contours.

Subjects. Thirty-six native Dutch listeners participated in the experiments. Their ages varied between 18 and 58; no hearing difficulties were reported and all subjects were paid a small fee.

Procedure. The data were presented to the listeners via an interactive computer program.[4] Subjects needed approximately 45 minutes to complete the task. Since the majority of subjects participated through Internet, there was no strict control over the circumstances under which the experiment was performed (such as ambient noise, type of headphones, type of loudspeaker, etc.).

In the pairwise comparison experiment subjects were asked to picture themselves as the speaker in each of the (visually) presented contexts and to decide which of the two melodic versions of the target utterance — which they could make audible as often as they wished — best fitted the given situation, indicating the confidence of their choice (sure/unsure).

In the rating experiment subjects were asked to judge the combination of a specific (visually presented) context and a specific (audible) target utterance on a ten-point scale, ranging from e.g. totally unacceptable intonation to totally acceptable intonation.

The order of the two experiments as well as the order of the four scales within the rating experiment was counter-balanced over subjects.

3. RESULTS

The results of the pairwise comparison experiment are given in figure 1.

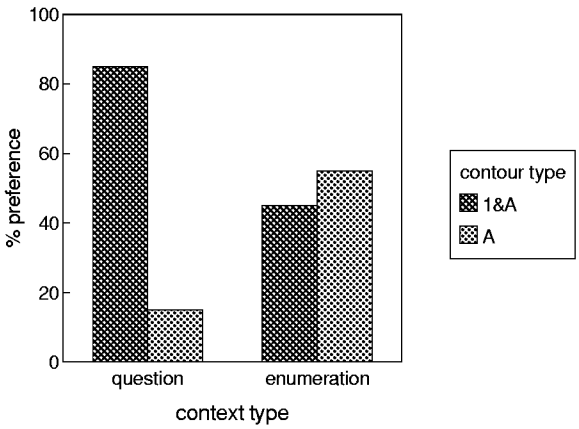


Figure 1. Percent preference for contour type, broken down by context type.

The influence of context type on the preference scores is highly significant (χ^2= 197.3, df=1, p<.001). When the subjects are presented with a 'question' context, contour '1&A' is preferred in 85% of the cases. In contrast, an 'enumeration' context leads to a preference for contour 'A' in 55% of the cases and for contour '1&A' in 45% of the cases, indicating that both contour 'A' and '1&A' are acceptable ways of intonatively marking the final part of an enumeration, but with a preference for contour 'A' (z= 2.13, p<.05).

Subjects were significantly more confident of their preferences in the 'question' contexts (79% sure responses) than in the 'enumeration' contexts (63% sure responses, χ^2=35.5, df=1, p<.001), which is in line with the finding that 'A' is not very suitable as response to a question, whereas both contours may mark the end of an enumeration.

Within the group of 'enumeration' contexts there is a significant effect of individual context on the preference responses (χ^2=16.7, df=3, p<.001), which is not the case within the group of 'question' contexts (χ^2=4.2, df=3, ins.): one of the four enumeration contexts leads to a preference for contour '1&A' instead of 'A', which may be explained by the fact that the accompanying target utterance is slightly more alarming than in the other three contexts ("*Marina is missing*" versus e.g. "*Marina is ill*"). This unforeseen effect detracts from the number of pro-'A' responses, but still the overall picture remains quite clear.

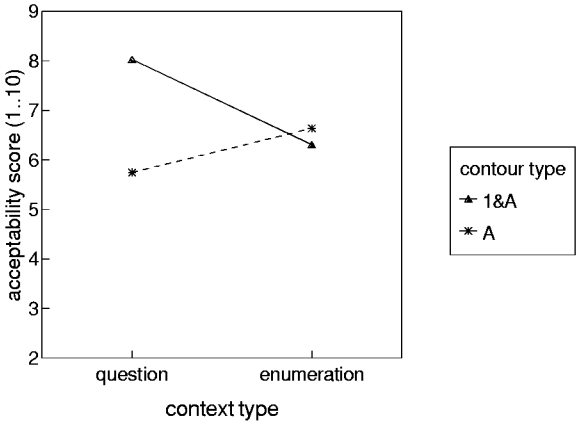


Figure 2. Acceptability scores per contour type, broken down by context type.

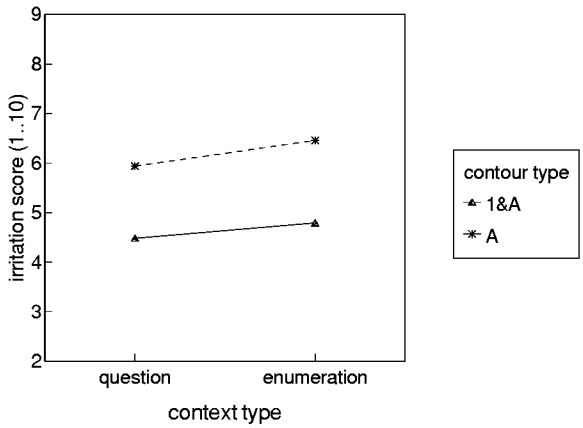


Figure 3. Irritation scores per contour type, broken down by context type.

In figures 2 to 4 the results of the rating experiment are presented. The acceptability judgments (figure 2) show that contour 'A' is not very acceptable on the answer to a question (a mean score of 5.8), whereas '1&A' is highly acceptable under the same circumstances (8.0); when the target utterance forms the end of an enumeration, both contours are acceptable, but with a slightly higher score for 'A' (6.6 versus 6.3). There is a significant interaction between contour type and context type ($F_{(1,284)}$=15.7, p<.001).

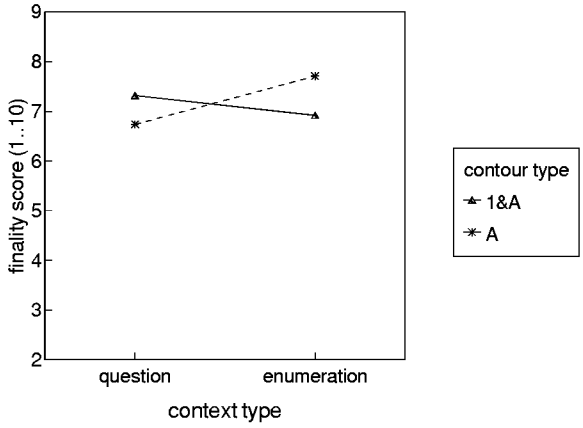


Figure 4. Finality scores per contour type, broken down by context type.

The irritation judgments (figure 3) show an overall effect of contour type: 'A' sounds irritated while '1&A' does not ($F_{(1,286)}$=30.0, p<.001), and there is no interaction between contour and context type ($F_{(1,284)}$<1).

The finality judgments (figure 4) do not reveal a main effect of contour type ($F_{(1,286)}<1$), but there is an interaction between contour type and context type ($F_{(1,284)}=7.2$, $p<.01$): '1&A' sounds a little more final when following a question (7.3) than when it's the final part of an enumeration (6.9), whereas 'A' sounds more final on the last part of an enumeration (7.7) than in response to a question (6.7).

4. CONCLUSION AND DISCUSSION

Summarizing, the acceptability scores closely reflect the preference judgments: 'A' is not very appropriate to mark the answer to a question, whereas both contours can be used to mark the final part of an enumeration, but with a light preference for 'A'. Furthermore, 'A' sounds more irritated than '1&A', but 'A' does not sound more final than '1&A' (or vice versa).

This means that:

- The preference judgements are completely in line with the predictions as derived from Keijsper's analysis, whereas Gussenhoven's predictions proved wrong;
- The acceptability scores reflect the preference judgments;
- The irritation scores follow Gussenhoven's predictions, while Keijsper did not offer any;
- The finality scores do not follow Gussenhoven's predictions, and Keijsper did not offer any.

We thus conclude that the meaning difference between pitch configurations '1&A' and 'A' affects both information status and attitude.

The finding that 'A' does not sound more final than '1&A' indicates that either downstep is not a feature of fall 'A', or that 'finality' is not commonly associated with the downstep morpheme.

It seems possible to incorporate differences in attitude in Keijsper's model, whereas it is not self-evident how a difference in information status should be reconciled with Gussenhoven's analysis of '1&A' and 'A' as instances of the same basic tone morpheme (H*L). The difference between the two pitch accent types seems more basic than is suggested by the autosegmental approach. We therefore propose that Keijsper offers the better form-meaning analysis.

Footnotes

[1] This research was funded by the Netherlands Organization for Scientific Research (NWO) through the Foundation for Language, Speech and Logic, under project #300-75-001.

[2] 'SELECTION', i.e., marking focused information as already present in the background, is the meaning associated with tone H*LH [3].

[3] Except when the utterance is used to address a person [4,5].

[4] The presentation was programmed by J.J.A. Pacilly B.Sc. of the Leiden University Phonetics Laboratory. URL http://fonetiek-6.leidenuniv.nl/caspers/le4-intro.html.

5. REFERENCES

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