

LING 800 Article Review

Pierrehumbert, J. and Hirschberg, J. (1990) The Meaning of Intonation in the Interpretation of Discourse, in P. Cohen, J. Morgan, and M. Pollack, (eds). *Intentions in Communication*, MIT Press: Cambridge, MA, 271-311.

A. Introduction

Pierrehumbert and Hirschberg (1990) propose a compositional theory of tune meaning, where tune refers to the intonational contour of an utterance. They first provide evidence for Pierrehumbert's (1980) theory of intonational description and transcription and define its component parts. They then argue that different tunes convey particular relationships between the content of an utterance and the mutual beliefs of the interlocutors, while also indicating relationships between preceding and subsequent phrases. They propose that these tune meanings are compositional, in that their meanings are the sum of individual pitch accents, phrase accents and boundary tones of which these tunes are comprised.

B. Summary of Arguments

The authors overview the relevant facets that compose an intonation pattern, namely stress, tune and phrasing. They define stress as being a relationship of acoustic prominence between syllables, where stressed syllables would manifest in longer duration, higher amplitude and more fully realized vowels. Additionally, they assume Pierrehumbert's (1980) theory of intonational description, in that tunes are expressed as a combination of high (H) and low (L) tones. The relationship between these tones and stress is marked through the use of pitch accents, which involve the alignment of either tone with a stressed syllable, indicated by the diacritic "*" (e.g. H* or L*). The authors posit that English possesses 6 pitch accent patterns: two simple tones and four complex tone patterns. With respect to phrasing, Pierrehumbert and Hirschberg delineate two levels of phrasing relevant to tune specification: intonational and intermediate. The latter is comprised of at least one pitch accent in addition to a phrase accent (simple H or L), which demarcates the intermediate phrase boundary. The phrase accent has control over the F0 between the final pitch accent of the phrase to the next intermediate phrase. An intonational phrase is composed of at least one intermediate phrase, and its end is marked with a simple H or L, followed by the diacritic "%".

The authors argue for Pierrehumbert's system of transcribing intonational contours by contrasting it with other existing transcription systems. They propose that pitch accent inventories are universal, regardless of whether one is in nuclear or prenuclear position. This differs from the British school (e.g. Crystal 1969, O'Connor and Arnold 1961), who do not disassemble their nuclear accent compositions and make a distinction between prenuclear accent arrangements and nuclear ones. The authors suggest that if one assumes the validity of their compositional account, this position would overlook crucial generalizations. Additionally, Pierrehumbert and Hirschberg argue that the use of 2 tones with the catathesis rule (providing for downstepping) allows for the same descriptive power as a 4-tone transcription system (Lieberman 1975). They posit that a system without a catathesis rule would make too many minute distinctions that would be difficult to integrate into a theory of interpretation.

Pierrehumbert and Hirschberg propose that the meaning of specific tunes can be derived from its individual tonal components, each part intended to convey specific discourse information. Which tune is chosen is dependent on which type of relationship between the content of the utterance and the mutual beliefs of the hearer (H) that the speaker (S) wishes to convey. They assert that pitch accents, phrase accents and boundary tones comprise overall tune meaning. Their

notion of compositionality is derived from the hierarchical structure of the phonological domain, where each tone type has interpretive scope over their respective domains while also contributing to the overall meaning of the tune.

Pitch accent. The role of pitch accents in tune meaning involves their transmission of information regarding discourse referents, predicates and modifiers, and relationships indicated by accented lexical items. Differences in pitch accent choice arise from whether S wishes to convey that the accented item should be included or excluded from what H mutually believes. H* marks “new” information to the discourse and that the accented expressions should be added to what is mutually believed by H. Conversely, L* is used to convey that such accented items are not involved in what is being predicated by S, and that the items are not a part of the overall expression being added to H’s mutual belief space. The authors provide examples (shown in 1 and 2) as evidence for the compositionality of meaning in intonation contours. In 1), they suggest the contour is “neutral declarative intonation” that can also be used when S believes such information is mutually believed and wants to indicate that it is already mutually believed to H. In example 2), they gloss the interpretation as “I thought it was good, but do you agree with me?” The authors state that in both instances, S wishes to establish that the information exists in or be added to H’s mutual belief space, as indicated by the H*.

- | | |
|---------------|---------------------------|
| 1) You turkey | 2) I thought it was good. |
| H* L L% | H* H* H H% |

You deliberately deleted my files.

Furthermore, complex pitch accents are categorized into two overall patterns: H + L and L + H. The authors assert that the latter pattern is generally used to evoke a salient scale. When the L is starred, S expresses a lack of commitment or uncertainty about a scale that has arisen in the discourse; whereas, when H is starred, S conveys a commitment to an accented item selected from a salient scale. They propose that the other pattern, H* + L, conveys to the hearer that they should find an inference path that supports the predication. The authors tentatively suggest that H + L* evokes a similar meaning, but without making a predication.

Phrasal tones. The domain of influence for phrase accents is the intermediate phrase, and phrase accents are often utilized to indicate the existence of a phonological and interpretive boundary. Pierrehumbert and Hirschberg posit that H phrase accents signify that the current phrase should be interpreted as a larger unit with the subsequent phrase; whereas, L phrase accents indicate that the current phrase should be interpreted as separate from the following phrase. Evidence involving the latter has been gathered from large intonational phrases comprised of adjacent intermediate phrases, lacking any intervening boundary tones. Similar to phrase accents, boundary tones indicate the degree of relatedness between intonational phrases, with a sense of directionality. H boundary tones convey a sense of “forward reference”, in that it points to the succeeding phrase to form an interpretive unit. L boundary tones indicate that the phrase is interpretively independent from succeeding phrases.

C. Discussion

Pierrehumbert and Hirschberg argue for a compositional theory of tune meaning, illustrating the need to decompose contours into sequences of individual tones that each have their respective contributions to the discourse. Crucially, they argue that such contributions are reliable across different sentence types and contexts. However, a strict theory of compositional meaning, as used in compositional semantics, would entail that meaning be derived from the meaning of each individual part and their mode of composition or the way in which they combine. The authors

themselves briefly note that they cannot provide an explanation for why complex pitch accents convey additional meaning. If we consider the examples $L^* + H$ and $L + H^*$, both types are supposed to evoke a salient scale and differ only in whether or not S is making a predication. We can appropriately derive the predication meaning from which tone is starred; however, this leaves the H tone in the first case and the L tone in the latter to evoke the scale. This presents an issue in that we have two different tones in two cases evoking a similar meaning, which, in and of itself, is not necessarily a major problem. The real problem is when we compare these examples to the $H + L$ complex pitch accents ($H^* + L$ or $H + L^*$), which involve the conveyance of an inference path. This would mean that the non-starred tones in these cases express the need to look for an inference path; whereas, in the cases discussed above, they evoke a salient scale. This is a problem in that these simple tones are serving “double-duty”, with different interpretations depending on their position. If the authors want to claim compositionality, then the meanings of the individual parts need to remain somewhat consistent across cases. If they are not consistent, then the authors need to define the relationship between tone meaning and its context. The authors themselves are unable to account for how the interpretive differences in complex tones are derived from the combination of simple tones. Given that there are only two possible tones with which to work, H and L, the authors will need to rigorously define composition rules for these elements. For example, they will need to address how the ordering effects influence interpretative meaning in order to make this a more viable model. The lack of any explicit definition of composition that accounts for the meaning of complex pitch accents suggests that in fact a 4-tone transcription system (c.f. Liberman 1975) might be more descriptively adequate.

Additionally, it is not completely clear how the three categories of tones (pitch accents, phrase accents and boundary tones) come together to contribute to the overall meaning. The authors are quite explicit about how they believe the individual tones should be interpreted; however, they do not clearly outline rules for composition over the entire intonational phrase. For instance, the authors break down the tune meaning of example 2) provided above, stating that the pitch accent in this case conveys that this information should be added to H’s mutual belief space, while the phrase accent and boundary tone “question” its appropriateness. If one considers their later definitions of phrase accents and boundary tones, it is not evident how they arrived at this meaning from the composition of elements. According to their definition, an H phrase accent indicates that the present phrase should be interpreted as being part of a larger unit, and that an H boundary tone conveys a sense of “forward-reference” with respect to subsequent phrases. This incongruence between tone definition and tune meaning highlights the need to bridge this gap by defining compositional rules.

Finally, although the authors do not state it explicitly, it appears that this compositional theory of tune interpretation was specifically developed for the English intonational system. While the authors make no claim of the extensibility of their model to other languages, one wonders what sort of cross-linguistic applicability this theory could have. They note that English has a “rich tune system” and that we have 6 different pitch accent patterns in our inventory. One would postulate that different languages would have different tune inventories. If they were to extend their theory to other languages, would it mean that the inherent discourse meanings behind the individual tones are consistent cross-linguistically, or the reverse, where tone meanings differ, but the rules of composition remain constant (as in compositional semantics)? In the case of the latter, it would provide additional motivation for the need to clearly delineate rules of compositionality.