

Stress and Non-Stress Accent

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Stress and Non-Stress Accent



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Preface

This book presents some data in support of the hypothesis that lexical accent in languages such as Dutch and English (henceforth 'stress accent') differs phonetically from accent in other languages such as Japanese ('non-stress accent') in that it uses to a greater extent material other than pitch. This hypothesis, which will be called the 'stress-accent hypothesis', makes two presuppositions.

The first presupposition is that there is such a thing as accent that can be identified and separated from other phonological phenomena in a language. Since the term 'accent' has been used in so many ways to mean so many different things, this presupposition amounts to an assumption of a theory of accent. As a matter of necessary groundwork, therefore, Chapters 1 through 3 of this book will present a definition of accent and review some of the arguments for it.

The second presupposition is that phonological categories are not necessarily phonetically uniform across languages or even within a language. A phonological property in one language may be phonetically different from 'the same property' in another language. Moreover, the difference need not be an absolute difference in the phonetic characteristics cueing the property, but can be merely a difference in the relative weight of these characteristics. (Thus the stress-accent hypothesis does not claim that stress accent differs from non-stress accent in not utilizing pitch as a cue, but rather that it differs in the extent to which it uses other characteristics in addition to pitch.) This presupposition seems obvious to the phonetician, who is familiar with the many different phonetic factors that can cue, for example, the single phonological property 'voiced'. I labor the point, however, since many earlier categorizations of accent have been inadequate precisely because the categorists overlooked the phonetic complexity of even the apparently simplest phonological elements.

Presuming, then, that there is some definable phonological phenomenon 'accent', and that the phenomenon in one language can differ phonetically from the same phenomenon in another language while still using many of the same phonetic cues, the stress-accent hypothesis proposes that stress accents differ from non-stress accents

in the degree to which they use phonetic attributes other than pitch patterns. In proposing these phonetic differences, the hypothesis does not also claim that they are the only differentiating factor or even the major differentiating factor. Indeed, the systems that will be cited in this book as typical stress accents often seem to differ from many of the non-stress-accent systems in other ways as well, ways that might be more interesting to the phonologist. I have chosen, however, to state the hypothesis entirely in terms of the phonetic differences, for two reasons.

The first reason is that the stress-accent hypothesis, if tenable, may explain why the notion of a type of phonological prominence utilizing loudness or force instead of pitch has persisted so long in the face of evidence that stress accent is not cued primarily by differences in acoustic energy level. Contrastive phonetic studies of like phonological phenomena in different languages often reveal important phonetic detail that is overlooked when only the phonological patterns are compared. In Chapters 6 and 7, data from a contrastive study of accent in English and Japanese will show that English uses duration and other 'secondary' physical attributes as correlates of accent far more than does Japanese, although both accentual systems seem to rely heavily on fundamental frequency. Interpreted in terms of certain experiments in psychoacoustics, this result may explain why English accentual contrasts have been described so often as loudness contrasts, whereas the Japanese accentual system has always been called a 'pitch accent'.

The second reason for the focus on phonetic differences is that phonological patterns often cannot be explained adequately without reference to the phonetic material that they utilize. As Ohala has repeatedly pointed out, 'the inherent physical constitution of sounds, i.e., how they are made and how they sound, [has] as much or more importance than system-internal relations, in determining the behavior of speech sounds' (Ohala, 1979, p. 49). For accentual systems, this means that the particular phonetic media through which accentual prominence is achieved will have significance in everything from how lexical accent might interact with intonational phrasing to how it will figure in sound change. In other words, once the phonetic attributes that characterize stress accents are known, the differences in phonological patterning may fall out naturally from them.

In contrasting stress accent to other types of accent, therefore, the stress-accent hypothesis concentrates on the phonetic differences between them. In the preliminary separation of accent from other phonological categories, however, it will be necessary to focus instead on the phonological patterns typical of accent, because, physically, accent is similar to and usually realized concurrently with certain

other phonological phenomena. The suprasegmental physical attributes of fundamental frequency and duration that are used in the formation of accentual contrasts are used also in tonal contrasts and in phonemic length contrasts, as well as in the more 'ideophonic' aspects of certain intonational structures. If accent is to be separated from such other phonological uses of the same phonetic material, the delimiting criteria must refer to attributes other than the physical characteristics of the sound patterns. They must refer to those aspects of the category's distribution and occurrence that give clues to its phonological function.

The first half of this book, therefore, departs from the strictly phonetic emphasis of the stress-accent hypothesis to present a definition of accent and to relate accent to other phonological phenomena that use the same phonetic material. In this part, there will also be a discussion of other, earlier definitions of accent, comparing the classificatory systems implicit in those definitions with the one proposed here.

The second half of the book then presents some evidence for the stress-accent hypothesis and the phonetic typology implicit in it. This evidence is only a first small step toward proving the hypothesis, because a claim for two such broad categories as stress-accent languages versus non-stress-accent languages cannot be tested conclusively without carefully controlled investigations of dozens of languages. A first approximation to such a test, however, can be made by comparing data from one or two representative languages from each group. The comparative data will be from two experiments comparing production and perception patterns in English and Japanese. The production experiment compares measurements of various acoustic parameters in English and Japanese minimal pairs elicited in comparable linguistic environments, and the perception experiment compares accent judgements by native speakers of synthetic stimuli made from the utterances used to obtain the acoustic measurements. Data from other experiments and other languages will be referred to where available, but it must be emphasized that only the two English-Japanese experiments will have been controlled for such matters as having identical measurement criteria in the production tests, or the same methods of varying the acoustic patterns in the synthetic stimuli for the perception tests.

The different emphases in these two parts of the book necessitate a difference in the types of arguments presented for the statements made. The first three chapters rely heavily on anecdotal or qualitative evidence, whereas the last two chapters look only at experimental or quantitative evidence. This difference in style of argument necessitates also a difference in the terminology used for the

various phonetic attributes discussed. In the first three chapters, the conventional phonological usage is followed; no attempt is made to consistently differentiate between terms such as pitch and those such as fundamental frequency. (This usage is unavoidable where earlier phonological treatments are discussed and compared.) In the later chapters, on the other hand, usage is stricter; 'pitch' and 'loudness' are reserved for the psychoacoustic attributes (or for the phonetic interpretation of the psychoacoustic attributes) and are not used interchangeably with the terms for the physical attributes, 'fundamental frequency' and 'amplitude'. (This usage is followed especially stringently in Chapters 4 and 5, which review the relationships among the relevant psychoacoustic and physical attributes.)

The various chapters in this book differ also in the extent to which they replicate material presented earlier in my doctoral dissertation, *Toward Phonetic Criteria for a Typology of Lexical Accent*, which was written while I was a graduate student in the Department of Linguistics at Cornell University. The account of accent and tone systems in Chapters 1 and 2 and the review of the psychoacoustics literature in Chapters 4 and 5 are only slightly modified or updated versions of sections of the dissertation. The report of the experiment in Chapter 6 has been reorganized to rid it of earlier redundancies, but presents no new data. The account of accent and its relationship to intonation in Chapters 1 and 3, on the other hand, has been completely rewritten to accommodate changes in my views on the topic, changes that result from work done since the completion of my dissertation. The experiment reported in Chapter 7 also is work done more recently, at the welcome urging of Marcel P.R. van den Broecke and Vincent J. van Heuven.

Since parts of this book replicate my dissertation, this preface gives me the opportunity to thank once again the many people who contributed in one way or another to the original dissertation. I am especially grateful to those at Cornell who aided or encouraged me while there, a long list of people that begins with my dissertation adviser, Frans van Coetsem, whose enthusiastic support first prompted my choice of thesis topic.

The work in this book done since the dissertation owes initially to Osamu Fujimura, who arranged for me to join his department at AT&T Bell Laboratories as a post-doctoral fellow upon my leaving Cornell, and to John Ohala, who persuaded me to try to publish the work. I thank also the many other people who have helped and encouraged me at Bell Laboratories, especially Janet B. Pierrehumbert. Her discussions on intonation and accent in general and her collaboration with me on intonation and accent in Japanese

have been a major impetus in the development of my understanding of how these two prosodic categories relate, an understanding which I hope will benefit further by future amicable arguments on the points with which she disagrees.

This preface also gives me the chance to again thank John S. Cikoski, whose contributions to this book went far beyond the mere tolerance of domestic neglect normally expected of authors' families.

CHAPTER 1

Defining accent

Hypothesis: Stress accent differs phonetically from non-stress accent in that it uses to a greater extent material other than pitch.

The stress-accent hypothesis proposed above refers to two phonological categories — accent and stress. Since these two words have been used by linguists to mean so many different things, a preliminary definition of the terms is always necessary when they are to be used.

In the statement of the hypothesis, ‘accent’ means a system of syntagmatic contrasts used to construct prosodic patterns which divide an utterance into a succession of shorter phrases and to specify relationships among these patterns which organize them into larger phrasal groupings. And ‘stress’ means a phonologically delimitable type of accent in which the pitch shape of the accentual pattern cannot be specified in the lexicon but rather is chosen for a specific utterance from an inventory of shapes provided by the intonation system.

This definition of accent and stress is intended to provide specific functional criteria for relating accent to certain other prosodic categories that linguists have often mentioned together with accent, but have not always related to accent in ways consistent with the stress-accent hypothesis. The two such prosodic categories which are most crucial to the correct interpretation of the stress-accent hypothesis are phonemic tone and intonation. This chapter outlines how the definition of accent presented here relates it to these two categories.

1.1 Differentiating accent from tone

The specification that accent involves syntagmatic contrasts is taken from Garde (1968), and is meant expressly to separate accent from paradigmatic prosodic contrasts, such as the opposition between long and short vowels in Japanese or the opposition between high-level syllables and high-rising syllables in Mandarin Chinese. Contrastive

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vowel length and tone seem to function primarily to distinguish one word from another that could have occurred in the same place. Their salient function is, in Trubetskoy's terminology, the distinctive one. Thus the length of a vowel in Japanese is just one more of the distinctive features that together oppose it to all other phonemes in the language, making it possible to distinguish, for example, the surnames Oogawa and Ogawa. Similarly in Mandarin, the tone pattern of a syllable is merely part of a large cluster of features distinguishing it from all other phonotactically possible syllables.

Accent, by contrast, seems to function less as a distinctive feature than as an organizational feature. In any given utterance, more prominent portions alternate and contrast syntagmatically with less prominent portions, creating a series of accentual phrases that are delimited by or centered around the prominent portions. This organizational function is reminiscent of Trubetskoy's delimitative and culminative functions, but it is unlike them in that it operates on several domains. Trubetskoy defined the two functions in reference to the word, with delimitative features being those that mark the boundaries between words and culminative features being those that signal the number of words without reference to their boundaries. The organizational function of accent, by contrast, often creates accentual phrases that are larger or smaller than anything that could be called a 'word'. In standard Japanese, for example, there is a well-defined level of accentual phrase that in citation form might be identified with the word or noun-phrase, but in actual speech more often corresponds to some larger piece, such as an adjective together with the following modified noun, or a noun in accusative or locative case followed by the governing verb. In English, similarly, there is a type of prosodic unit defined by alternations among reduced and unreduced vowels, and in actual words, there can be two or more such units.

On the other hand, in many languages, it is possible to define a phonological unit 'word' as the smallest piece that can stand alone as a separate phrase defined by a single accentual prominence at some level. Moreover, in some languages, words can contrast paradigmatically by the placement of this culminative accentual prominence when they stand as complete accentual phrases. In such languages, accentual patterns can fill the distinctive function as well as the organizational function. Because of this possibility, it is not always easy to separate accent from tone. A more appropriate view is perhaps to set up a continuum between 'pure' accent and 'pure' tone, locating phonological phenomena in various languages along the continuum by the relative salience of the two different functions.

The idea that accent is different from paradigmatic oppositions such as tone is by no means original with the above-stated definition of accent as an organizational feature. Trubetskoy's delimitative and culminative functions are early statements of such an idea, although Trubetskoy classified culminative features as a special subtype of distinctive feature rather than including them with delimitative features as would the otherwise very similar treatments of Arisaka (1941), Martinet (1965), and Garde (1968). Like the organizational definition of accent, all of these treatments differentiate accent from tone by explicit reference to some phonological function vaguely similar to the organizational function described above.

The idea that accent is different from tone is seen also in the work of some generative linguists. McCawley (1970; 1978), for example, has made use of what might be called a culminative 'principle' without referring explicitly to the phonological function. In McCawley's taxonomy, accent is distinguished from tone by the type of phonological rules that characteristically operate on it and by the type of specification that it requires in the lexicon. Whereas the phonological rules that operate on tones produce the familiar assimilations and dissimilations seen in segmental distinctive features, rules operating on accent 'apply in such a way as to yield outputs in which each phrase has at most one accent' (McCawley, 1978, p. 119). Whereas the dictionary entry of a lexical unit for a tone system must specify tone features for each each separate syllable, that for an accent system need specify only an accentual feature at a single location in the word. The use of accent in autosegmental phonology to mean a formal place marker for some basic tone shape (Goldsmith, 1976; 1982) is a more recent restatement of this same idea. These generative linguists define accent in terms of the symptoms of the culminative function rather than in terms of the function per se, but their definitions do yield nearly the same taxonomy that the explicitly functional treatments do, and in this respect they differ from many other earlier classificatory schemes.

One earlier American usage, for example, was to analyze stress accent as a system of paradigmatically opposed 'stress levels', and to use accent as a general cover term for any set of prosodic properties that can perform the distinctive function (e.g., Trager, 1941; Hockett, 1958). In these classificatory schemes, accent is defined functionally, but only the distinctive function is recognized. These early structuralist treatments ignore the extreme dependence upon intonational context that characterizes the distinctive use of accent patterns.

Another very common usage that has an even longer history is to ignore function altogether and concentrate instead on the phonetic

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material supposedly involved. This usage can be exemplified by Passy's (1891; 1906) contrast between languages with 'l'accent de force' and languages with 'l'accent musical' or by Jones's (1950) contrast between 'stress languages' and 'tone languages'. In this usage, stress is defined as the linguistic use of articulatory or acoustic energy, and prosodic systems using stress are distinguished phonetically from tone systems, which use pitch.

Both of these earlier usages imply a classification of prosodic systems that is fundamentally different from the categorization implicit in the organizational definition of accent. The classificatory scheme that recognizes only the distinctive function excludes from accent those prosodic systems that distribute accentual prominences delimitatively, and includes those systems that would be classed separately as tone if the organizational function were recognized. The classificatory scheme that recognizes only phonetic criteria, on the other hand, puts in tone many of the non-stress accents that use pitch levels or pitch contours culminatively as part of the lexical level of the organizing pattern. Both earlier usages assume a definition of stress and a classification of stress accent relative to tone that is incompatible with the stress-accent hypothesis. In the first usage, the stress-accent hypothesis is a trivial statement, since stress accent is obviously an accent system that uses stress levels rather than pitch to contrast words. In the second usage, the stress-accent hypothesis is a self-contradictory statement, since a system that uses pitch in any way would be not accent at all but tone. Neither of these usages gives a classification of stress relative to tone that captures the essential similarity among all accent systems and their apparent difference from systems of phonemic tone.

A complete understanding of the difference between accent systems and tone systems will probably not be possible until the relationship between each of these and the total prosodic system of the language (including intonation) has been thoroughly described. Even without such a thorough description, however, there is already a large body of data more readily at hand to support the classification of accent as functionally different from primarily distinctive categories such as tone. This evidence comes from areas as diverse as tonogenesis and the phonology of synchronically productive derivational patterns. Moreover, in many of the earlier taxonomies of prosodic systems, there are often hints toward the classification implicit in the definition offered above. Indeed, the emerging consensus among linguists over the last eighty years seems to be that accent is different from tone and that the difference lies in something like its organizational characteristics. The separation of accent from tone is

thus neither original to this book nor likely to be very controversial. The development of the organizational definition of accent systems as separate from tone systems and the more readily available evidence for that separation will be discussed further in Chapter 2.

1.2 Relating accent to intonation

By contrast to the separation of accent from tone, a second aspect of the organizational definition of accent is more controversial and rather more difficult to justify — namely, the relationship that it implies between accent and intonation. On the one hand, by avoiding any reference to phonetic material beyond the vague specification that accentual contrasts be prosodic, the definition is meant to preclude any assumption of purely phonetic criteria for separating accentual patterns from intonational patterns in the suprasegmental makeup of an utterance. On the other hand, by stating that these patterns organize the utterance at some basic level of phrasal structure, the definition is meant to preclude also the assumption of a perfect identity between the accentual pattern and some of the more paradigmatic, iconic aspects of the intonational pattern.

The organizational definition of accent rejects phonetic criteria for differentiating accent from intonation because the experimental literature on intonation and accent has shown the two systems to be inextricably linked together in the prosodic patterns of utterances. It is impossible to give an adequate description of the production and perception of accent patterns in English without describing at the same time the phonetic and phonological structures of intonation. More recently, experimental investigations of accent and intonation in several other languages have shown that English is not unique in this regard. The notion that accent and intonation are phonetically independent, however, has a long history and has persisted in some version in every linguistic school. Several sections of Chapter 3 will describe the various incarnations of this notion and review the evidence against it.

The organizational definition of accent is not the first theory of accent to reject the notion that accent patterns can be distinguished from intonation patterns on the basis of their phonetic composition. Bolinger's pitch-accent theory also does, and for the same reasons (Bolinger, 1958; 1978). However, Bolinger's account of the relationship between accent and intonation differs from the functional account in several crucial ways. Bolinger equates accent in English directly with certain prominence-lending pitch obtrusions and does not separate the obtrusions into such syntagmatic features as accent placement and more paradigmatic features such as choice of accent shape. Moreover, Bolinger identifies the function of prominence-

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lending pitch obtrusions completely with the more ideophonic aspects of intonational structure. In pitch-accent theory there is no such thing as a neutral intonation pattern; all uses of accentual prominence have some sort of meaning having to do with an intonational focus on the accented constituent and including an attitudinal component conveyed by the pitch-accent type.

The organizational definition of accent, however, precludes such an analysis of the relationship between accent and intonation in English. It assumes a theory of intonation in which there can be such a thing as a 'neutral' intonation pattern specifying little more than the phrasal organization of the utterance to which is applied. In such an intonational pattern, the accent system predicts many of the prosodic elements at the different levels of the phrasal hierarchy. Accent also provides the link between the intonational system and the lexicon by specifying any aspects of the intonational pattern that are peculiar to individual words and by stating the derivational or inflectional regularities that govern the patterns of larger lexical structures.

The organizational definition of accent assumes such a theory of intonation over Bolinger's pitch-accent theory in part because Bolinger's equation between accent and prominence-lending pitch shapes is incompatible with the extent to which accent patterns in English are correlated with and can be cued by other characteristics of the prosodic pattern such as duration and vowel quality. More important, Bolinger's pitch-accent theory of intonation is rejected for its inadequacy as a general theory of accent and intonation. Despite his claims for its universality (Bolinger, 1978), pitch-accent theory does not provide an accurate description of intonation in languages which do not share the rich inventory of pitch-accent shapes that characterizes English and instead specify the shape of the pitch accent from within the lexicon, leaving to intonation only the choice of deleting or not deleting a pitch accent to accord with the larger prosodic organization of an utterance.

Consider, for example, the intonation system of standard (Tokyo) Japanese as described by Pierrehumbert and Beckman (Beckman and Pierrehumbert, 1985; Pierrehumbert and Beckman, in preparation), and compare it with the intonation system of English, as described in Pierrehumbert's earlier work (Pierrehumbert, 1980, 1981; Liberman and Pierrehumbert, 1984; Anderson et al., 1984). An intonation contour in standard Japanese can be described as a sparsely-specified sequence of high and low tones which are grouped into several types of tone 'morphemes'. As in English, these tone morphemes include boundary tone shapes, which do not belong to specific syllables or morae in the utterance, but rather are aligned with the edges of prosodic phrases. The F_0 contours in Figures 1.1a and 1.1b illustrate

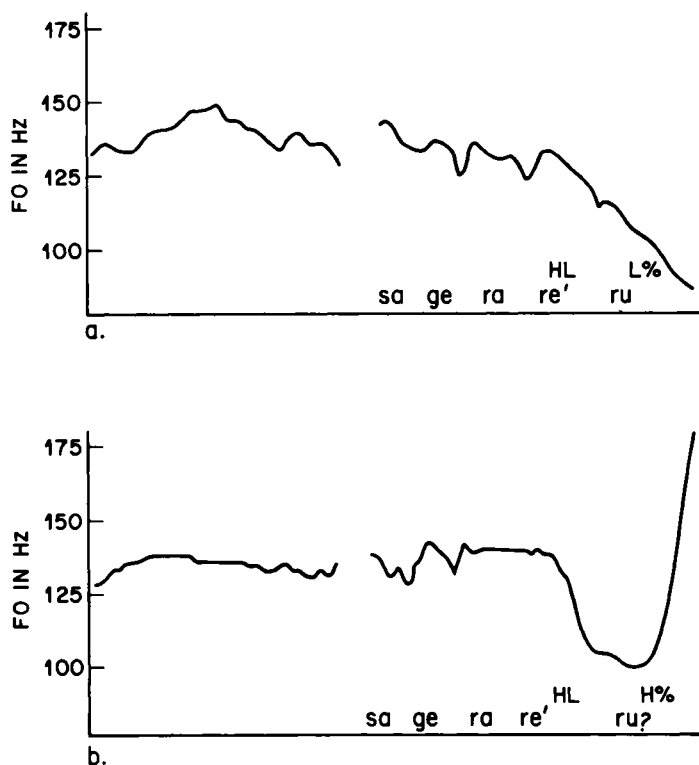


Figure 1.1. Fundamental frequency contours for two renditions of the phrase *mizigawa ga sagerare'ru*. Version in (a) is a statement with a L% boundary tone, version in (b) is a question ending in a H% boundary tone.

two very common types of boundary shapes that can occur at the ends of major intonational phrases in Japanese. They are very similar to the contrasting English boundary tones shown in Figures 1.2a and 1.2b.

In addition to the boundary shapes, the tone morphemes of a Japanese intonation contour also include shapes that belong to specific syllables or morae in the utterance. The high tone followed by a low tone in the utterances in Figure 1.1, for example, is associated to the penultimate syllable. This high-low shape must occur at that particular place in this intonation contour. Similarly in the English utterance in 1.2a, the high tone on the first syllable must go on that syllable in this word. Such associated tone shapes are the 'pitch accents' of the utterance. If any of the utterances in these two sets of intonation curves were longer and included more than a single accental phrase, more such pitch accents would be required. Then

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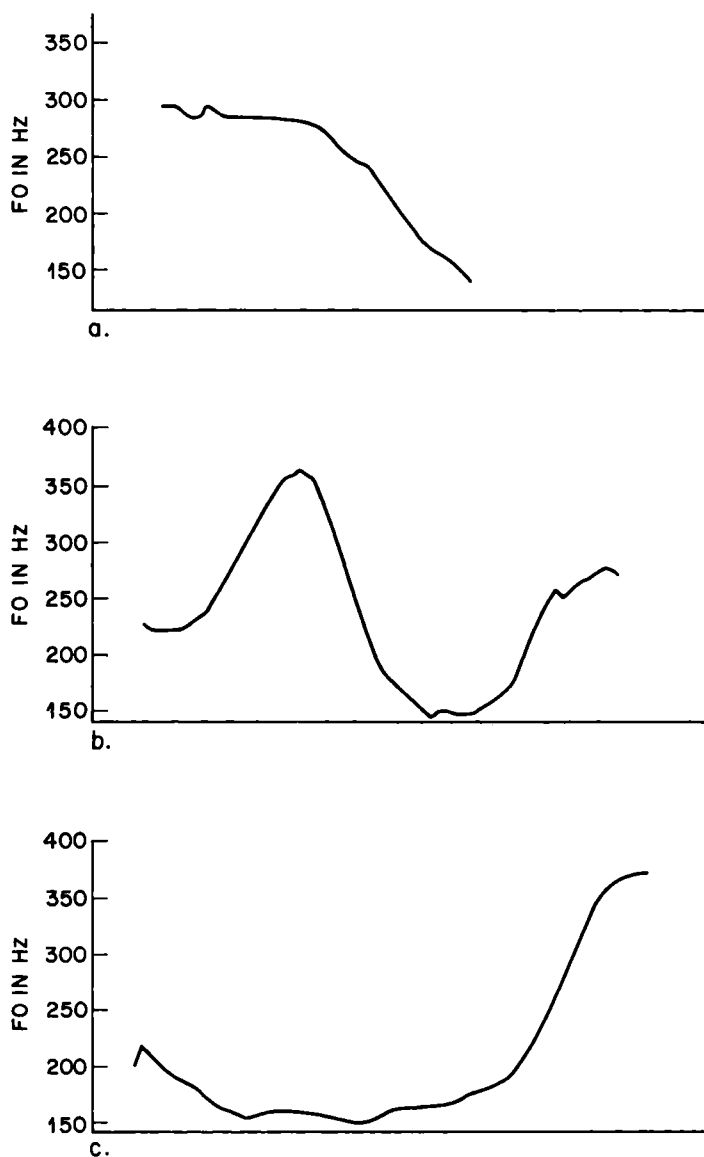


Figure 1.2. Fundamental frequency contours for three renditions of the word *Anna*. Version in (a) is a simple neutral declarative intonation ($H^* L L\%$). Version in (b) is a contour conveying surprise or incredulity ($L+H^* L H\%$). Version in (c) is a typical interrogative intonation ($L^* H H\%$).

the scaling of the accents within the pitch range of the utterance could be compared, and it would soon become clear that the high tones are not all at the same high value within the pitch range, nor

are the low tones all at the same low value. The relative placement of its component tones within the pitch range is an important part of the prominence of a pitch accent relative to other pitch accents. The relationships of greater or lesser prominence among the accents in turn contribute to the larger organization of the intonation contour, as governed by certain language-specific rules. In Japanese, for example, a more prominent accentual phrase cannot occur to the right of a less prominent accentual phrase within the same intermediate-level phrase grouping. In an English intonation contour, no accentual tone-shape can occur after the most prominent accent within such a phrase grouping. The existence of pitch accents and the principles governing the relationships among the accents are important similarities between these two accent languages.

There is also one major difference between the two languages that is evident in the contrast between the English intonation contours in Figures 1.2b and 1.2c. These two utterances have the same accentual structure and the same H% boundary tone. However, whereas the accent in Figure 1.2b consists of a pitch rise on the accented syllable, the accent in Figure 1.2c is an associated low tone. The choice of this particular pitch shape gives the utterance a different meaning from the incredulous rhetorical question in Figure 1.2b. This availability of several different possible shapes for the accent is similar to the availability of different possible shapes for boundary configurations in the two languages. But the choice of an alternate shape for the accent is not a possibility in Japanese. The accent on the penultimate syllable in the Japanese intonation contours in Figures 1.1a and 1.1b must consist of a high tone followed by a low. The only choice that exists for the speaker is whether to change the organization of the utterance by subordinating this high-low accent completely or partially to other accents within the same utterance.

In describing standard Japanese, the phonologist can specify both the place and the pitch shape of the accent within the lexicon or he can specify only the place of accent in the lexicon and list the single possible shape in the intonational inventory of tone morphemes. There are no clear language-internal grounds for choosing between these two modes of description, although the existence of other non-stress-accent languages in which both the place and the shape of the accent must be specified (e.g., Swedish) might influence a choice for the former. In describing English, on the other hand, the phonologist can choose only the latter mode of description, because the pitch shape of the accent is by no means the property of the word with the accent, but rather, like the shape of the boundary configuration, is a property of the specific intonation contour.

This characteristic of the relationship between the lexical specification of accent placement and the intonational specification of accent shape in English is the defining characteristic that differentiates stress accent from non-stress accent. When a non-stress-accent language has several possible pitch shapes for accents, the shape is a phonological feature of the individual lexical item. Of the two different accentual pitch shapes of standard Swedish, for example, some words have one and some words have the other. It is an arbitrary feature of the word itself, just as the placement of the primary stress is for an English word. In a stress-accent language, by contrast, the choice of pitch shape for an accent is like the choice of the boundary configuration. It is part of the paradigmatically contrasting inventory of tone morphemes available in building the intonational meaning of the utterance and is not a phonological feature of the word.

The organizational definition of accent recognizes that not all intonation systems are like that of English, and instead takes the organizational capacity of accents and prominence relationships among them to be the universal defining characteristic of an accent system. Moreover, since accentual prominence is not defined *a priori* to be a matter of pitch obtrusion, the definition allows for the possibility of phonetic differences among accent languages. Indeed, this possibility is the motivation for the stress-accent hypothesis. Since stress-accent systems can associate the same accent within an accent pattern with several different pitch shapes for different intonation contours, might they not then compensate for this phonetic uncertainty by using other phonetic cues more? Might there not be, for example, an accompanying durational pattern to ensure that the tonal pattern of an utterance is correctly interpreted for its particular accentual organization? These issues will be discussed in more detail in Chapter 3.

CHAPTER 2

Accent systems and tone systems

As noted in Chapter 1, the definition of accent assumed there implies that accent systems are distinct from primarily paradigmatic systems such as tone. This distinction is based upon apparent differences in the phonological functions of the prosodic patterns of words in languages that can be classified as having accent or as having tone. Not all linguists, however, have recognized these functional differences. Indeed, some linguists have classified the prosodic systems included in these categories in ways having almost nothing to do with phonological function. This chapter will review the treatment of accent versus tone in other earlier categorizations of prosodic phenomena, and then discuss the more easily discernible characteristics that differentiate the two, showing how these characteristics are symptomatic of their differing functions.

2.1 Historical overview

2.1.1 Early classifications based on phonetic criteria

Early descriptive linguists based their categorizations of prosodic phenomena almost entirely upon phonetic criteria. Accent was categorized as separate from tone in these early taxonomies because of its supposedly different physical properties. The physical properties attributed to accent are stated most explicitly in Sweet's definitions of 'stress' and 'force':

Physically [force] is synonymous with the effort by which breath is expelled from the lungs.... Acoustically it produces the effect known as 'loudness' which is dependent on the size of the vibration-waves which produce the sensation of sound. (Sweet, 1906, p. 47)

The comparative force with which the syllables that make up a longer group are uttered is called 'stress'. (ibid, p. 49)

Sweet's understanding of the physical constitution of 'stress' was typical of linguists of his time, and served as the basis for the various taxonomies that separated prosodic phenomena involving loudness or force from those involving pitch. Passy, for example, opposed an *accent musical*, which utilized pitch, to an *accent de force*, which was

directly equivalent to Sweet's 'stress':

La *force* (Allemand *lautheit*, anglais *loudness*. Nous n'avons pas de bonne expression équivalente.) provient de la rapidité avec laquelle l'air est chassé des poumons. (Passy, 1891, p. 41-42)

Quant à la force relative des diverses parties d'un groupe, il est facile de distinguer des syllabes *fortes*, *moyennes* et *faibles*... On dit souvent que la syllabe forte *est accentuée* ou *porte l'accent* de force; que les autres sont des syllabes *inaccentuées* ou *atones*. (Passy, 1906, p. 27)

Although Passy thus separated accent from tone entirely in terms of their supposed physical makeup, he did touch on some functional differences among languages with *l'accent de force*. He noted, for example, that by contrast to French, the opposition between accented and unaccented syllables in some other languages is 'very marked' and can differentiate meanings:

En français, la différence est si peu sensible, que des observateurs étrangers ont pu croire que toutes nos syllabes étaient également fortes. Dans les langues germaniques, surtout en allemand, l'opposition est au contraire très marquée; de même en italien, en espagnol et en portugais. Elle peut alors servir à changer complètement le sens, par exemple d'un mot composé: anglais *'drawback* <<inconvenient>>; *to 'draw 'back* <<reculer>>. (Passy, 1891, p. 63)

These differences in the way languages use stress, however, were clearly secondary to the primary opposition between languages with *l'accent de force* and languages with *l'accent musical*. Examples of the latter were languages like Swedish, Lithuanian, Chinese and Vietnamese — languages in which 'deux mots, identiques pour tout le reste, sont néanmoins parfaitement différenciés par leur intonation.' (Passy, 1891, p. 70-71).

The asymmetry of this opposition should be noted. *L'accent de force*, on the one hand, is a completely phonetic category, including uses of *force* ranging from that of distinguishing words ('Elle peut alors servir à changer complètement le sens.') to that of highlighting particular words in a sentence (Passy, 1906, p. 32-35). *L'accent musical*, on the other hand, is phonetically delimited from *l'accent de force*, but it is also functionally delimited from other uses of pitch. It does not include languages in which 'les intonations ... sont employées uniquement pour indiquer le sens général d'une phrase' (Passy, 1891, p. 70).

Passy's categorization of *l'accent de force* versus *l'accent musical* translates exactly into Jones's (1950) distinction between 'stress languages' and 'tone languages'. Like Passy's *l'accent de force*, 'stress languages' is a phonetically delimited category covering all possible phonological functions: