116 Sentential Prominence in English

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1 Introduction

In the linguistic expressions of many languages, words vary in prominence. In the English compound (1a), there is some sense in which *tax* has more prominence than *relief*, and in the sentence (1b) the same can be said about the subject NP *My bike* as compared to the verbal phrase *has been stolen*. Example (1c) illustrates how the perception of prominence can be more differentiated than this: *English* appears to be more prominent than *teacher*, which in turn may seem more prominent than *Old*.

(1)   a.   tax relief
       b.   My bike has been stolen!
       c.   an Old English teacher

The above observations touch on two aspects of the phonological structure of English which have been the topic of intense debate over the past decades. The first concerns the phonological nature of this prominence: how is it represented in the structure? There have been widely different answers to this question. The main division is between views that see prominence as a single dimension and views that separate word stress from intonational pitch accents. A number of representations that fall in the first class of views are discussed in §2. §3 introduces the second class and explains the difference between word stress and accentuation. §4 then returns to some of the examples discussed in §2, offering an account for them first by assuming that the sentence prominences are pitch accents, and second by identifying the accent assignment or deletion rules that are held responsible for the distribution of the pitch accents in each case. In doing this, §4 also takes a position on the second main controversy: why are the various levels of prominence to be found where they are? What determines that in (1a) through (1c) *tax*, *bike*, and *English* have the most prominence within their structures and what determines that *teacher* may seem more prominent than *Old* in (1c)? Finally, §5 considers the question of whether there are residual differences in prominence that are not covered by the description in §3 and §4. It concludes by suggesting that such differences arise during phonetic implementation rather than being due to differences in representation.

2   The phonological representation of prominence

A useful simplification of the changing perspective on the nature of sentential "stress" is to distinguish two views. The first view, to be referred to as the Infinite Stress View (ISV), takes the impression of multiple degrees of prominence as a starting point and translates these into a representation of gradient stress. This is the older of the two views, and was the basis of an early treatment of stress above the level of the word in generative phonology (Chomsky and Halle 1968). The other view, the Pitch Accent View (PAV), takes sentential prominence to be due to intonational tones that are associated with specific syllables. This view was first expressed by Bolinger (1958), who introduced the term "pitch accents" for these tones (see CHAPTER 32: THE REPRESENTATION OF INTONATION; CHAPTER 50: TONAL ALIGNMENT for related discussion). Today, there are probably no linguists who adhere to the ISV in its original form. Many, however, adopt some version within a newer conception of sentential prosodic structure, which is also, or even largely, composed of an intonational structure.

2.1   The infinite stress view

The earliest views saw stress as an increase in loudness due to greater amplitude of the sound wave (CHAPTER 39: STRESS: PHONOTACTIC AND PHONETIC EVIDENCE). This implies that stress is a continuous phonetic variable, which can have different values within words as well as across words. The idea that word stress and prominence differences among words are essentially the same phenomenon is expressed in Bloomfield (1933: 111), for instance. He distinguished "emphatic stress," as on the syllable *my* in (2) (where I have reproduced his original transcription of *This is my birthday present*), from "high stress," as in the syllables *this* and *birth-*, which is different from "low stress" on *pres-*, which in its turn is distinct from "no stress," on all other syllables.

(2)   ˈðis iz ˈmaj ˈbəːθdej ˌpreznt ("i.e. not yours")

Chomsky and Halle (1968: 20) incorporated the ISV in their rule-based grammar of English stress. Example (3a) has the most prominence on *board*, but *black* can be felt to have more prominence than *eraser*. The stress pattern is therefore 2 1 3. In (3b), *black* is most prominent, while *eraser* has more prominence than *board*, giving 1 3 2. Finally, (3c) again has the most prominence on *board*, but of the other two words it is *eraser* that seems more prominent than *black*, giving 3 1 2. The stress levels 2 and 3 are best compared across the three structures, instead of within them, for instance by comparing *black* in (3a) and the same word in (3c).

(3)   a.   *a black board-eraser*   'a board-eraser that is black'   2 1 3
       b.   *a blackboard eraser*   'an eraser for a blackboard'   1 3 2
       c.   *a black board eraser*   'an eraser of a black board'   3 1 2

Chomsky and Halle accounted for this three-way distinction by postulating two rules, reproduced in (4a) and (4b), plus a convention, (4c). The order of

application is free, but their domain is determined by the morphosyntactic structure: the rules apply "inside out," beginning in the smallest domain (CHAPTER 85: CYCLICITY). Their application is "serial," meaning that the output of one rule feeds as input into the next rule (CHAPTER 74: RULE ORDERING). To start off, every word is assumed to have primary stress, stress level "1," on the syllable with main word stress.

(4) a. Assign primary stress to the primary-stressed vowel in __ . . . $\overset{1}{V}$ . . .]$_N$.

    b. Assign primary stress to the primary-stressed vowel in $\overset{1}{V}$ . . . __ . . .]$_{NP}$.

    c. When primary stress is placed in a certain position, then all other stresses are automatically weakened by one.

The results of this procedure are given in (5). Case (5a) is a noun phrase consisting of the adjective *black* and the noun *board-eraser*. The first domain is the noun, a compound. Rule (4a), also known as the Compound Stress Rule, applies to the last but one primary stress, the one on *board*, and, following convention (4c), weakens the stress on *eraser* by one. The next domain up is the noun phrase, in which primary stress is assigned to the last of two primary stresses by (4b), also known as the Phrasal Stress Rule or the Nuclear Stress Rule, causing all stresses except the one on *board* to be weakened by one. The representation immediately below a horizontal line is the input to a rule. In (5b), we see how the Compound Stress Rule applies twice, while both rules apply to (5a) and (5c), in opposite orders.

(5) a. [[*black*]$_A$ [[*board*]$_N$ [*eraser*]$_N$]$_N$]$_{NP}$

1	1	1	Starting point
	1	1	(4a)
	1	2	
1	1	2	(4b)
2	1	3	Output

    b. [[[*black*]$_A$ [*board*]$_N$]$_N$ [*eraser*]$_N$]$_N$

1	1	1	Starting point
1	1		(4a)
1	2		
1	2	1	(4a)
1	3	2	Output

    c. [[[*black*]$_A$ [*board*]$_N$]$_{NP}$ [*eraser*]$_N$]$_N$

|			
1	1	1	Starting point
1	1		(4b)
2	1		
2	1	1	(4a)
3	1	2	Output

If each of the structures in (5) was to be embedded in longer structures, primary stress would be weakened by one with each level of embedding. For instance, in *It's a shame that you threw out my new blackboard eraser*, the stress level on *black*

would still be "1," but that on *eraser* would be down to "6." Chomsky and Halle recognized this weakness in their description, and suggested that there must be some level beyond which no further distinctions are made. A disadvantage that they did not address is the poor comparability of stress levels across the structures. Is the "3" in (5a) really the same as that in (5b)? And are they the same as the "3" in (5c)? This question becomes more pressing once we consider a fourth possibility, one with two applications of (4b). The structure of (6b) comes out as 2 3 1, but the "3" of (6) does not resemble the "3" in (5b).

(6) a. *A black bored eraser* 'a bored eraser who is black' 2 3 1
     b. [*a* [*black*]ₐ [[*bored*]ₐ [*eraser*]ₙ]ₙₚ]ₙₚ

A general response to this type of problem was given by Liberman and Prince (1977), who maintained that stress is not phonetically absolute and hence cannot really be compared across different linguistic structures, but is "relative," comparable only within a given structure. They proposed a "metrical tree," potentially infinitely large, which was consistently binary branching. Each binary branching tree ended in a "weak" and a "strong" node. This is shown for *Tennessee* in (7a) and *dew-covered lawn* in (7b) (see also CHAPTER 40: THE FOOT; CHAPTER 41: THE REPRESENTATION OF WORD STRESS).

(7) a.   b.

         Tennessee   *dew covered lawn*

They made this proposal while addressing another problem with the Chomsky and Halle description. This concerned data like those in (8), which illustrate what has been called a "rhythm rule" and "stress shift." Here, words that have primary stress on a later syllable (see the first column in (8)) appear to have more prominence on an earlier syllable when they combine with another word (see the second column in (8)). Since the description in (5) assumed "1" stress on just one syllable of any word, there was no mechanism in place in Chomsky and Halle (1968) for transferring a "1" within the word.

(8) a.   3 1   2 4   1
           thirteen   but   *thirteen men*
     b.   3   1   2   4 1
           Tennessee   but   *Tennessee Ernie*

The "metrical tree" has in fact been used to express the effect of the rhythm rule, as a switch of the weak and strong nodes in a sub-tree, first by Kiparsky (1979).

In (9a), the switch is shown in the circled nodes of the representation (8b) for the word in (7a). However, Liberman and Prince (1977) proposed another form of representation, the "metrical grid." A metrical grid represents the stress level of every syllable as a column of elements, represented here by "x." Liberman and Prince (1977) used this representation to express the conditions under which a "stress clash" – the proximity of two stresses at some level – was relieved by the retraction of the left-hand stress. An example is (9b), where the boxed part of the metrical grid represents a stress clash and the arrow indicates its resolution by the transfer of the top element over *-see* to the column over *Ten-*.

(9)   a.   b.

Tennessee Ernie   *Tennessee Ernie*
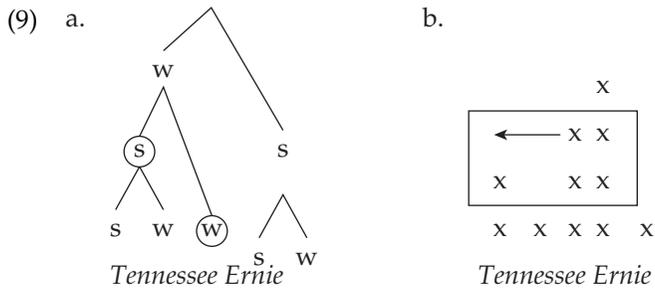
Liberman and Prince considered that (9b) provided a more transparent mechanism for expressing the effect of the rhythm rule. Indeed, in many cases, such adjustments are made between syllables that do not form the nodes of any subtree. In right-branching structures like *Ralph Vaughan Williams*, for instance, where *Vaughan Williams* forms a *w-s* tree (the strong node of a tree which has *Ralph* as its weak node), there is no sub-tree over *Ralph* and *Vaughan* and thus no way to express that *Ralph* has more prominence than *Vaughan*. However, the metrical grid, too, failed to capture the facts. Identical prominence configurations appeared to behave differently. For instance, (10a), from Prince (1983), is not treated the same as (10b), from Hammond (1984). In (10a), the rhythm rule transfers prominence from *Paine* to *Tom*, something that can be correctly characterized in both the metrical grid and the metrical tree. However, in (10b), the same operation is ill formed: here, *Paine* retains the greatest prominence within the domain *Tom Paine Street*. Kager and Visch (1988), who offered an extensive treatment of the pros and cons of the two mechanisms, suggest that these examples can still be accommodated in a tree-based description by requiring the switching nodes to be immediately dominated by a *w*-node. This condition would correctly prevent (10b) from undergoing the switch, but would run foul of cases like (10c), in which *Aunt Sue*, a *w-s* structure dominated by a *w*-node, does not undergo the rhythmic adjustment that *Tom Paine* does in (10a). Therefore, even the adoption of both representations, as in Hayes (1984), does not provide a solution to the description of sentential "stress" in English.[1]

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[1]   *Big Band* is a phrase in American English, but a compound in Canadian and British English. Here, the phrasal pronunciation is assumed.

(10)   a.

Tom Paine Big Band

b.

Tom Paine Street blues

c.

Aunt Sue Big Band
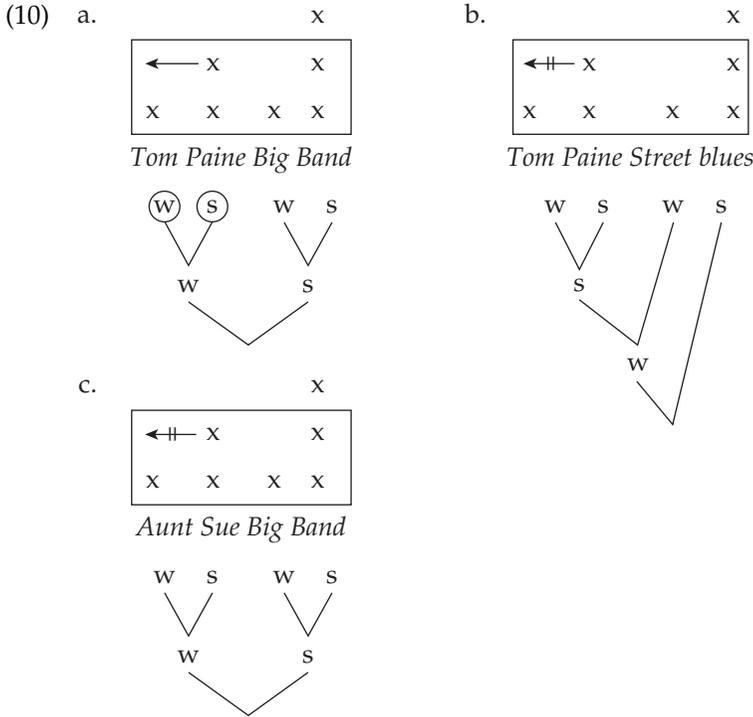
2.2   *The problem with the ISV*

The deeper problem lies in the conception of phonological prominence, more specifically in the hypothesis that prominence levels above the word are of the same kind as prominence levels within the word. The next section will argue that word prosodic structure is essentially different from sentential prosodic structure. Part of the reason why they have been conflated is that acoustic measurement techniques have only been readily available since the last quarter of the twentieth century and, where they existed before, the implications of the data they provided were not always adequately incorporated into the way linguists thought about stress. As we will see in §3, when a speaker produces even a single word, we do not only observe the word prosody, but also its sentence prosody. While the connections between these two representations are strong, they are separate components of the phonological structure of English.

3   The pitch accent view

3.1   *Pitch and stress as independent components in syllable prominence*

The new conception of phonological prominence followed various demonstrations that differences in stress are not expressed in acoustic intensity differences, or even auditory loudness differences. Mol and Uhlenbeck (1956) showed that no

matter how greatly they boosted the intensity of the first syllable of the English verb *permit*, it did not at all sound like the noun *permit*. Given that intensity is by its nature an unreliable phonetic parameter – think of the effect on the acoustic signal of the direction of the wind when speaking in the open, or of head turns by the hearer or the speaker during speaking and listening – languages should not be expected to invest intensity differences with phonological distinctiveness. Experiments by Fry (1955, 1958) showed further that listeners recognized stimuli that were potentially ambiguous between the verb and noun versions of *permit* on the basis of the pitch contour, and pitch was therefore identified as the main cue to the perception of stress, alongside duration and vowel quality. The idea that pitch is a separate component in phonological prominence from the durational and spectral properties of syllables was the topic of Bolinger (1958): "pitch and stress are phonemically independent."

3.2   Stress

A little more than half of the syllables in English are stressed, the other half being unstressed (see also CHAPTER 40: THE FOOT; CHAPTER 41: THE REPRESENTATION OF WORD STRESS). Among the stressed syllables, primary (or main) stress is distinguished from secondary stress. In (11), unstressed syllables are shown as [·]. Stressed syllables are shown with a column of two [x]s (primary stress) or one (secondary stress) (cf. Hayes 1995; Halle and Vergnaud 1987). A stressed syllable forms the beginning of a foot, indicated by ( ). There is therefore one foot in (11a) and (11g), two in (11b), (11c), (11e), and (11f), and three in (11d). In transcriptions, primary stress is usually indicated by a high stress mark ['] and secondary stress by a low stress mark [ˌ]. Note that (11g) gives the British English pronunciation of *melancholy* ['melənkəli].

(11)   a.   x   b.   x   c.   x   d.   x
          · (x ·)   (x   ·)(x)   (x) (x)   (x) (x) (x)
          A'laska   *'Manda,rin*   *ˌsar'dine*   *ˌTimˌbuc'too*

       e.   x   f.   x   g.   x
          (x ·)(x ·)   (x ·) (x ·)   (x ·   · ·)
          'heliˌcopter   *ˌmari'huana*   *'melancholy*

Each representation in (11) is distinctive: if we changed any of it, a different phonological structure would arise. However, not all configurations are grammatical. For one thing, only one word-initial syllable can remain unstressed, and thus remain unfooted, as shown in (11a): */ələ'skɑː/ is ungrammatical. Word-initial unfooted ("stray") syllables do not have a coda consonant in English, as in *banana*, *tomato*, or if they do, are prefixes in borrowed Romance words ("Latinate prefixes"), as in *abstain* [əb'steɪn], *concur* [kən'kɜː]. Second, every major class word must have minimally one foot, and a foot is the minimal requirement for an utterance. Function words may have unstressed syllables only, like *a* /ə/, but they must combine with a footed word. Third, no stressed syllable could be maintained on the second syllable of (11b), since open syllables between stressed syllables cannot be stressed (*/'mændɑːˌrɪn/). But /ˌælə'skɑː/, /ˌmæn'dɑːrən/, /ˌmændə'rɪn/, /'sɑːˌdiːn/, and /ˌtɪm'bʌkˌtuː/, for instance, are all possible, although non-existent English words.

If we abstract away from the presence of a pitch accent, the difference between stressed and unstressed syllables is phonetic in many languages (CHAPTER 39: STRESS: PHONOTACTIC AND PHONETIC EVIDENCE). The stressed syllables may be longer and have greater intensity, as in Spanish (Ortega-Llebaria 2006), or the segments in them may additionally be more precisely articulated, as in Catalan (Astruc and Prieto 2006; cf. Sluijter and van Heuven 1996). In English, such differences have been phonologized, meaning that the greater duration and the articulatory precision have led to constraints on the segmental composition of stressed and unstressed rhymes. A stressed rhyme in English must consist of a long vowel or diphthong or a short vowel plus a consonant. An unstressed rhyme cannot contain any vowel other than [ə i u] (Bolinger 1986: 347).[2] Most importantly from the point of view of our topic, only stressed syllables can be accented.

3.3   Accent

Accent is a place marker in the phonological structure where tones are to be inserted (Goldsmith 1977; Hyman 1978; CHAPTER 42: PITCH ACCENT SYSTEMS). The location of these accents, as well as their presence, may be lexically determined, as in Japanese (see also CHAPTER 120: JAPANESE PITCH ACCENT). For instance, (12a) and (12b) are accented words, but differ in the location of the accent, while (12c) is an unaccented word.

(12)   a.   hási 'chopsticks'   b.   hasí 'bridge'   c.   hasi 'edge'

In other languages, accent is assigned on the basis of phonological or morphological information, as in Nubi, a creole spoken in Uganda and Kenya. All Nubi words have one accented syllable, but a verb loses its accent when it combines with an object into a nominalized VP. In (13a) and (13b), a minimal pair of verbs is illustrated in combination with an object; in (13c) the nominalization is shown, and since both 'rent' and 'rent out' now lose their accent, the sentence is ambiguous (Gussenhoven 2006).

(13)   a.   ána gí   pángisa júa   'I will rent out a house.'
              I   will rent-out house
         b.   ána gí   pangísa júa   'I will rent a house.'
         c.   pangisa   júa   séme má   'Renting (out) a house is good.'
              rent(-out) house good be

How does English differ from Nubi? The first difference concerns the existence of a choice among the tone(s) to be inserted in any accent position. In Nubi, an accented syllable must have an H* pitch accent. In English, the requirement is merely that a pitch accent be inserted, but which one, out of the many that could be

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[2]   The final vowel in words like *fellow* was taken to be an allophone of unstressed [u] by Bolinger. Before consonants, [ɪ] may appear, but the situation varies across varieties. In mainstream American English, [ə] and [ɪ] are allophones, with [ɪ] appearing before velars, as in *secure* [sɪˈkjur], and [ə] elsewhere, as in *Sinatra* [səˈnɑtrə]. In a number of varieties, including ones spoken in the USA, [ə] varies with [ɪ] in some contexts (e.g. *peerless* is [ˈpɪələs] or [ˈpɪəlɪs], while contrasting them in other contexts, as in *roses vs. Rosa's* or, for non-rhotic dialects, *offices vs. officers*. In unstressed syllables, a syllabic consonant may take the place of a historical [ə] (e.g. *listen* /ˈlɪsn/).

chosen (L*, H*L, L*H, etc.), is left to semantic and pragmatic factors (Pierrehumbert 1980; Beckman 1986; Hayes 1995; CHAPTER 32: THE REPRESENTATION OF INTONATION). Second, the prominence of an accented syllable in Nubi is due solely to the presence of the pitch accent, that is, H*. A deaccented syllable – *pan-* or *-gi-* in (13c), depending on whether /pángisa/ or /pangísa/ is the underlying form – is no different from a syllable that is unaccented in the underlying form, like *-sa*. English unaccented syllables, however, are either stressed or unstressed. That is, deaccenting is not neutralizing the way it is in Nubi, as illustrated in (14) (cf. Ladd 2008: 49). For the admittedly contrived (14a), *permits* is a verb ('allows Sed to do that'), with an initial unstressed syllable and main stress on *-mit*. In (14b), *permits* is a noun, with a reverse stress pattern. Even though they are unaccented, the verb and the noun are phonologically distinct. (I will henceforth use capitalization to indicate English accent, as is common in the literature on West Germanic languages.)

(14) a.   His WORK permits Sed that
      b.   His WORK permits said that

The third difference concerns the number of generalizations (rules or constraints) that involve accents. The gerundial deaccentuation in (13c) is one of two processes that have been reported for Nubi that manipulate accents. The other is a rule that places the accent on the first syllable of any adjective when preceding a noun, as shown in (15a), with concomitant deletion of any later accent, which is present in (15b).

(15) a.   késim njerekú   'foolish child'
           foolish child
      b.   njerekú kesím   'the child is foolish'

Processes that manipulate the distribution of accents thus vary across languages. In Japanese, for instance, there is no equivalent of the Nubi "rhythm rule" illustrated in (15), and [umái zjúuzu] 'sweet juice' will therefore not become *[úmai zjúuzu] (Kubozono 1993). However, Japanese has a large number of morphological accenting and deaccenting rules. Compound formation is an example, a complex one, as it happens. Noun–noun compounds, which maximally have one accent, typically place the accent on the first syllable of the second noun if the second noun has three or more moras – see (16a) and (16b) – and on the last syllable of the first noun if the second noun has one or two moras (see (16c)). If the second noun is accented on a non-final syllable and is longer than four moras, the accent in the compound often corresponds to the accent in the underlying form of the second noun, as in (16d). In addition, some nouns of one or two moras are "deaccenting morphemes," meaning that any compound that has them as its second member is unaccented, as in (16e). As a result, noun–noun compounds never have the accent on the last syllable (Poser 1985; Kubozono 1993: 14). (The change from [k] to [g] in (16a) and [t] to [d] in (16e) is due to a voicing rule known as *rendaku*.)

(16) a.   mé 'eyesight' + kusuri 'medicine'   megúsuri   'eyewash'
      b.   nuno 'cloth' + fukuró 'bag'   nunofúkuro   'cloth bag'
      c.   kabúto 'helmet' + musi 'insect'   kabutómusi   'beetle'
      d.   jamá 'mountain' + hototógisu 'cuckoo'   jamahototógisu 'mountain
                                                                    cuckoo'
      e.   huusen 'balloon' + tamá 'ball'   huusendama   'balloon'

English has a rather large number of accentuation and deaccentuation rules. First, words may have more than one accent, specifically words that have stressed syllables before the main stress, as in *CAliFORnia* (Selkirk 1984). Second, in addition to two rules that resemble the two Nubi rules, it has a rule deleting initial accents and, importantly, a rule that distributes accents to mark information structure. §4 is devoted to accentuation in English.

4   Accent in English

There are two ways in which the description of accentuation in English could be approached. We could either assume that accents are absent and assign them where they are needed, or we could assume that syllables are accented by default and assume they are removed where they do not occur. The second approach is in tune with descriptions of information structure in which accents are removed for "givenness," instead of assigned for "newness" (Schwarzschild 1999) and was adopted for other rules in Gussenhoven (1991, 2005). In the deaccentuation option, accents are first assigned to all syllables that can ever be accented, and then removed where they are not needed. In §4.1, I define the accented syllables of English in two steps, one for primary stressed syllables and one for secondary stressed syllables. §4.2 then describes three deaccentuation rules, the compound deaccentuation rule (henceforth the "Compound Rule"), the Initial Accent Deletion rule, and a rule I will refer to as the "Inverse Compound Rule." §4.3 is devoted to the Rhythm Rule. §4.4 contains three sections dealing with meaningful phrase-level effects: Schmerling's generalization (§4.4.1), phatic elements (§4.4.2), and information structure (§4.4.3). §4.5 deals with the status of pre-nuclear accents. Finally, §5 discusses prominence distinctions that cannot be attributed to stress or accent, and §6 concludes the chapter.

4.1   Lexical generalizations in English

Taking the position of main stress for granted, the first accentuation rule is straightforward: place an accent on the primary stress of every word. The words in (12) come out as in (17) as a result.

(17)   aLASka, sarDINE, cigaRETTE, HELicopter, marihuAna, MELancholy

Secondary stressed syllables before the primary stress are also provided with pitch accents. As a result, the representations of *sardine*, *cigarette*, and *marihuana* are as in (18).

(18)   SARDINE, CIGaRETTE, MARiHUAna

Two comments are required here. First, English has "cyclic" stress (Kiparsky 1979). This means that the primary stress of a base survives a morphological derivation that adds a primary stress to the right of the base. The old primary stress will now be a pre-primary secondary stress. In (19a) and (19b), the secondary stress is on the second syllable of the word, because that is where the base has its primary stress; in (19c) it is on the first syllable, for the same reason. In terms of their accentability, there is no difference between the primary stressed syllables

in the base words and the secondary stressed syllables in the derived words. The preservation of the accentable syllable typically fails, however, when the old and new primary stresses are adjacent, as in *exPLAIN*, but *EXplaNAtion* (*exPLAINAtion*).

(19) a. conSIDer – conSIDeRAtion
      b. asSOciate – asSOciATion
      c. CHARacterize – CHARacteriZAtion

The second comment concerns a systematic exception to the accentuation of pre-primary stressed syllables: simplex words in which the second syllable has main stress are not accented on the pre-primary stressed syllable, as shown in (20); prefixed words like *ARCH-BISHop*, *EX-COLonel*, and *UNMODest* have accents on their prefixes as well as their bases (Gussenhoven 1991).

(20)   sepTEMber, ocTOber, senSAtional, techNIcian (*SEPTEMber, etc.)

Indirect evidence comes from Singaporean English, which, according to Siraj (2008), places a M*H pitch accent on syllables corresponding to the primary stress and the pre-primary stress, except in cases like (20). This leads to tone patterns like (21), where H spreads right and L is provided for any initial unaccented syllable. In (21a), two pitch accents occur, while the same is true for (21b), where there is however a word-initial unstressed syllable *con-* (a "Latinate" prefix). In (21c), the word-initial syllable is stressed, because it is closed and is not a prefix, but it remains unaccented, as it does in British English. Native speakers of Singaporean English thus translate the F0 properties of stressed *sen-* and unstressed *con-* alike, showing that to them the F0 properties are more salient than the vowel reduction and duration properties. Language-internal evidence is discussed in §4.3.

(21) a. char ac te ri sa tion   b. con si de ra tion   c. sen sa tio nal
          M*H   M*H   L M* HM*H   L M* H

4.2   Lexical accent deletion in English

4.2.1   Compound deaccentuation
The Compound Stress Rule of Chomsky and Halle (1968), given as (4a), comes out as a Compound Deaccentuation Rule in PAV, as formulated in (22).

(22)   Deaccent the second constituent of a compound.

As a result of the rule, compounds, which started out with accents on both members, as in *MARiHUAna CIGaRETTE*, etc., end up with the accent distributions given in (23).
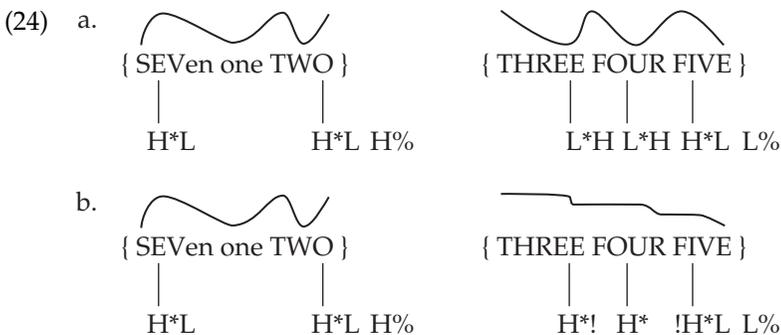
(23)   MARiHUAna cigarette, LEMon grass, SILly season, MANhandle, MOONsick

Among the West Germanic languages, English stands out as limiting the working of Compound Deaccentuation, no doubt due to the influx of Norman French compounds after 1066, which must have retained accent on the last constituent. As a result, many structures have accents on both constituents, the "phrasal stress" pattern of Chomsky and Halle (1968). Among the more stable categories here are food items (i.e. dishes), like *CHICKen SOUP, LEMON TEA, CHERRY PIE*, those whose first constituent refers to time or place, like *WINter STORMS, VILLage CLOCK, WORLD WAR*, and geographical names except those whose second constituent is *Street*, like *ABBey ROAD, HAMmersmith BRIDGE,* but *OXford Street* (cf. Plag *et al.* 2008). Notice that the counterpart of Chomsky and Halle's Nuclear Stress Rule, earlier given as (4b), has no correspondent in PAV: the words in the "phrasal stress" cases simply retain their accents.

4.2.2   The salience of pre-nuclear and nuclear accents

The Reverse Compound Rule and Initial Accent Deletion delete pre-nuclear accents. These rules have been discussed much less, due to the low salience of pre-nuclear accents. Nuclear accents are more salient for several reasons (cf. Ladd 2008: 260). The first concerns their final status. If a speaker produces a nuclear accent on *WASn't* in *My phone number WASn't 712 345*, thus having no accents on any of the separately spoken digits, the digit *5* will be the most easily remembered, simply because it is last in the utterance. Phrase-final words thus have salience independently of the accentuation. The second reason for the salience of the last accent is that it is often, though not always, pronounced with greater pitch excursion. Lastly, multiple occurrences of pre-nuclear pitch accents are often the same, while the nuclear accent is different. A reading of a six-digit phone number like (24) would typically be divided into two intonation phrases. The second intonational phrase is here given three accents, with L*H pitch accent on pre-nuclear *three* and *four*, and an H*L pitch accent on nuclear *five*. In this case, in addition to being last, the last pitch accent stands out also for being different from the accents on the previous two digits.

   Having said this, the last accent may on occasion sound less salient than the pre-nuclear one(s), which is particularly true for a downstepped H*. In the reading shown in (24b), the accents on *four* and *five* are downstepped, and listeners are likely to consider the pre-nuclear accent on *three*, not the nuclear accent on *five*, to be the most salient (Cruttenden 1997: 44; Ladd 2008: 259a).

(24)   a.   { SEVen one TWO }   { THREE FOUR FIVE }

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

        b.   { SEVen one TWO }   { THREE FOUR FIVE }

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

4.2.3   Reverse compounds

"Reverse compounds" are structures in which the first constituent is deaccented. When the first constituent in the NP denotes the category and the second constituent is the name of the item belonging to that category, the first constituent is deaccented. Example (25b) is from Selkirk (1984: 221), who pointed out the contrast with the phrasal *LAKE HILL* 'a hill called after Mr or Mrs Lake', where no deaccenting takes place. The example is representative of geographical names of this type, like *Mount Kilimanjaro*; (25c) illustrates a person category.

(25)   a.   the BOOK JOSHua   →   the book JOSHua
      b.   LAKE HILL   →   lake HILL
      c.   AUNT AGatha   →   aunt AGatha

4.2.4   Initial Accent Deletion

Initial Accent Deletion causes all accents except the last to be deleted in a class of morphological formations, most strikingly compounds. In (26), examples are given in which the first constituent has two accents underlyingly. In the compound noun (26a), the double-accented word *marihuana* loses its pre-final accent, and in (26b) *Tom* undergoes the same fate, as it is the pre-final accent of the name *Tom Paine*, a noun phrase included as the first member of a compound noun. Similarly, *Old* loses its accent in the noun phrase *Old English*, because it too is embedded in a noun compound, while (26d) shows that multiple pre-nuclear accents will all be deleted. Example (26c) forms a minimal pair with the noun phrase *old English teacher* 'an English teacher who is old', where the head noun is the compound *English teacher*: here *old* retains its accent. Similarly, *a Second Language Conference* ("a conference on the study of L2") has an accent just on *Language*, while *a second Language Conference* ("the second of a series of conferences on language") has accents on *second* and *Language*.

(26)   a.   MARiHUAna cigarette   →   mariHUAna cigarette
      b.   TOM PAINE street   →   tom PAINE street
      c.   OLD ENGlish teacher   →   old ENGlish teacher
      d.   i-COULDn't-CARE-LESS attitude   →   i-couldn't-care-LESS attitude

Initial Accent Deletion also applies to English words formed with the help of suffixes that leave the stress pattern of their base intact. These are known as "stress-neutral" suffixes, and include *-ish*, *-ist*, *-ly*, *-ness*, and *-less*. ("Stress-changing" suffixes include *-ian*: compare *ALbuquerque – ALbuquerqueish*, but *ALbuquerque – ALbuQUERquian*.) The suffixes *-based*, *-fast*, *-free*, *-like*, *-proof*, *-prone*, *-style*, *-tight*, *-type*, *-wise*, and *-worthy* also belong here, as does the accented suffix *-esque*. The examples in (27) are presented without a "walk-through," but notice the case of (27d), where the base, *REMbrandt*, starts out with only a single accent. Here it is the accent on the suffix that is the last accent in the derived word.

(27)   a.   UNKINDness   →   unKINDness
      b.   TAIPEI-based   →   taiPEI-based
      c.   NORTH-koREa-style   →   north-koREa style
      d.   REMbrandTESQUE   →   rembrandTESQUE

Reverse compounds, too, undergo Initial Accent Deletion. If the second member has two accents, only the last of these survives. In fact, the Reverse Compound Rule could be subsumed by Initial Accent Deletion, but I have preferred to treat the reverse compounds separately, in order to identify them as a group that requires further research.

(28) a. mount KIlimanJAro   →   mount kilimanJAro
      b. route SIXty-ONE   →   route sixty-ONE

4.3 A post-lexical phonological generalization in English

Once words are inserted into phrases, further deletions of accents may take place. These "post-lexical" generalizations are in part phonological, meaning they are triggered by specific phonological contexts, and in part morphosyntactic, in which case the deletion of the accent is the direct expression of a meaning distinction. The most widely discussed phonological generalization, earlier illustrated in (8), concerns "stress shift," more properly "rhythm-induced accent deletion," also known as the Rhythm Rule. In the PAV, this rule deletes medial accents in the phonological phrase (Gussenhoven 1991; Shattuck-Hufnagel *et al.* 1995). Consider the alternants of *Japanese* in (29). In (29a), we have an isolated pronunciation, in which both accents are retained. In (29b) the first syllable loses its accent, as it is medial in the phonological phrase, while in (29c) the third syllable loses its accent, because *it* is medial. The phonological phrase (ф) is a prosodic constituent above the phonological word, and corresponds in the default case with a syntactic phrase.

(29) a. (JAPaNESE)$_\phi$
      b. (GOOD japaNESE$_\phi$
      c. (JAPanese GOODS)$_\phi$

The Rhythm Rule makes it clear that it is important to describe the presence of pre-primary accents in words. For instance, (30a) shows that words like *sepTEMber* and *senSAtional* – cf. (20) – really lack an accent on the word-initial foot, while (30b), from Jones (1967), shows that disyllables like *DUNDEE* do have one, just as words like *inTERpreTAtion* and *asSOciAtion*, shown in (32c); cf. (19). Example (30d) shows the effect of *-esque*, due to Initial Accent Deletion. In (30e) (cf. (12a) from Prince 1983), we again see the effect of that rule. *Street* has lost its accent through the Compound Rule and *Tom* lost its accent through Initial Accent Deletion, meaning that there is no medial accent left for the Rhythm Rule to delete. In (30f), there are two medial accents to be deleted by the Rhythm Rule. Next, in (30g)–(30i), we see the effect of Initial Accent Deletion on reverse compounds, and the subsequent inability of the Rhythm Rule to contribute to their prosodic shape.

(30) a. (sepTEMber STORMS)$_\phi$ *not*   (SEPtember STORMS)$_\phi$
      b. (DUNDEE MARmalade)$_\phi$ →   (DUNdee MARmalade)$_\phi$
      c. (asSOciATion FOOTball)$_\phi$ →   (asSOciation FOOTball)$_\phi$
      d. (rembrandTESQUE LIGHT)$_\phi$ *not*   (REMbrandtesque LIGHT)$_\phi$
      e. (tom PAINE street BLUES)$_\phi$ *not*   (TOM paine street BLUES)$_\phi$

f.	(TOM PAINE BIG BAND)$_\phi$	$\rightarrow$	(TOM paine big BAND)$_\phi$
g.	(aunt SUE BIG BAND)$_\phi$	$\rightarrow$	(aunt SUE big BAND)$_\phi$
		not	(AUNT sue big BAND)$_\phi$
h.	(mount kilimanJAro BLUES)$_\phi$	*not*	(MOUNT kilimanjaro BLUES)$_\phi$
		not	(mount KIlimanjaro BLUES)$_\phi$
i.	(route sixty-ONE BLUES)$_\phi$	*not*	(ROUTE sixty-one BLUES)$_\phi$
		not	(route SIXty-one BLUES)$_\phi$

4.4   *Meaningful distinctions at the phrasal level*

The motivation for having pitch accents on particular words in English sentences has traditionally been looked at from a syntactic perspective. The Nuclear Stress Rule of Chomsky and Halle (1968), given in (4b), applied inside phrases, as illustrated in (5a) and (5c), as well as to combinations of phrases. As a result, (31a) was interpreted as having the primary stress on the object NP *Mary*, a pattern known as "normal" stress. Other prosodic versions of the same sentence, like (31b), were said to have "contrastive stress," due to contextual constraints that more recently have been collectively called "information structure." In (31b), a contrastive stress rule, not formalized, has retained the primary stress on *John*, demoting the stress levels on *kissed* and *Mary* as a result.

(31)   a.   [[*John*]$_{NP}$ [*kissed* [*Mary*]$_{NP}$]$_{VP}$]$_S$

1	1	1	Starting point
	1	1	(4b)
	2	1	
1	2	1	(4b)
2	3	1	Output

    b.   A: *Who kissed Mary?*

            1   3   2

        B: [[*John*]$_{NP}$ [*kissed* [*Mary*]$_{NP}$]$_{VP}$]$_S$

Schmerling (1976) and others have pointed out that the distinction between "normal" and "contrastive" is not easily maintained. "Normal" stress may seem an unproblematic concept in (31a): this is how the sentence would be produced when read from a contextless written presentation. In many situations, however, such a reading may strike the listener as quite marked. In (32a), the prominence on *two* seems both "contrastive," in the sense that the two-year-old is compared with some older individual, and "normal," in the sense that this is how any native speaker would read it. Schmerling (1976) also pointed out that the way her husband announced the death of President Johnson to her was as (32b), an out-of-the-blue statement, with no accent on *died*. As it happened, some weeks earlier, her mother had announced the death of another American president, Truman, as (32c). Unlike Johnson, Truman had been critically ill for some time and his death came as no surprise. I here give Schmerling's (1976) prominence patterns as accentuations. It is hard to see which utterance has "normal stress"; if a choice must be made, it would be (32b), unlike what the Nuclear Stress Rule predicts.

(32)   a.   Even a TWO-year-old can do that
      b.   JOHNson died
      c.   TRUman DIED

The unexpected lack of accent on verbs had earlier been addressed in a revision of the way the Nuclear Stress Rule applies. Bresnan (1971) proposed that it applies to an underlying syntactic structure, and that syntactic movement rules may move words from final position, along with the "highest stress." For instance, a sentence like *I have some BOOKS to read* can be argued to derive from *I have [[to read some BOOKS]*$_{NP}$*]*$_S$. A related proposal within Chomsky's phasal conception of syntactic derivation is presented in Adger (2007). Other treatments of the connection between syntax and sentence stress are given by Cinque (1993), Zubizaretta (1998), and Kahnemuyipour (2009). Work that has explored the relation between syntactic theory and sentential stress has largely been concerned with describing the location of the nuclear accent only. (See also Truckenbrodt 2006.)

The data that have been discussed under "normal stress" and "contrastive stress" are dealt with in three sections dealing with predicate deaccentuation, phatic element deaccentuation, and deaccentuation for "Givenness," respectively.

4.4.1   Schmerling's generalization: Predicate deaccentuation

Schmerling proposed that a case like (32b) is to be explained by a predicate deaccentuation rule: "predicates receive lower stress than their arguments, irrespective of their linear order in surface structure" (1976: 82). The translation in the PAV is that predicates are deaccented when they combine with an argument. Among the examples she gave was *Great oaks from little acorns grow*, where the last accent is on *acorns*, not on *grow*, contra the prediction of the Nuclear Stress Rule (4b). Predicates are semantic functions, lexically specified as taking zero, one, two, or three arguments. Each of these represents a semantic "role," like "Agent," "Theme," or "Goal." Zero-argument predicates are restricted to verbs denoting weather conditions, as in (33a). Examples (33b) and (33c) illustrate a Theme and an Agent in one-argument verbs, while (33d) combines these roles in a two-argument verb. "Goals" are indirect objects, often expressed in prepositional phrases. For the purposes of the generalization, the latter include locative predicate complements with existential verbs (*be, live*) and destination predicate complements with verbs of motion, as in (33d). One-argument predicates are known as "intransitive verbs," two-argument predicates as "transitive verbs," and three-argument predicates as "ditransitive verbs," as illustrated in (33f), or "double object verbs" if the Goal can be an NP rather than a PP, as illustrated in (33g).

(33)   a.   *snow* ( )   *It's snowing.*
      b.   *die* (Theme)   *Truman died.*
      c.   *work* (Agent)   *Mary is working.*
      d.   *kiss* (Agent, Theme)   *John kissed Mary.*
      e.   *go* (Agent, Goal)   *John went to the shopping mall.*
      f.   *take* (Agent, Theme, Goal)   *John took the donkey to the vet.*
      g.   *give* (Agent, Theme, Goal)   *Mary gave John a book.*

Thus, in (32b), *died* loses its accent because the argument *Johnson* is adjacent to it. Similarly, in *He kissed the BRIDE*, it is the accent on the argument *bride* that allows *kissed* to be deaccented, and the same can be said of the accent on *floor* and the predicate *put* in *It was put on the FLOOR*. Because of its SVO word order, English does not obviously show the effect of Schmerling's generalization, since any accent on the verb is typically pre-nuclear, a non-salient position (§4.2.2). In

addition to subject + intransitive verb sentences like (32b), there are however the constructions illustrated by *There are some LETTers to post*, *There's a FLY in my soup*. The accentuation in these sentences is in no sense "contrastive," yet they fail to have an accent on the rightmost constituent.

Schmerling's thesis has been highly influential in subsequent work. One observation was that argument–predicate combinations can be compared with compounds in the sense that the entire construction is served by the accent on a subconstituent: the argument and the predicate are "integrated" into a single constituent (Fuchs 1984). Just as the accent on *lemon* in the noun *LEMon grass* is non-contrastive ("normal"), so is the accent on *fly* in the sentence *There's a FLY in my soup*. At the same time, of course, additional constituents are not so "integrated" by these accents. When we add an adjective to the compound, like *fresh* in *FRESH LEMon grass*, or an adverbial like *much to your discredit* to form *There's a FLY in my soup, MUCH to your disCREDit*, additional accents will occur. The phrasal constituent served by the accent on the argument was termed a "focus domain" in Gussenhoven (1983a), and figured in the Sentence Accent Assignment Rule (SAAR). Sentences were divided into sequences of focus domains, or "accent domains" (AD) as Büring (2006) called them; the latter term is to be preferred, as "focus domain" is easily confused with "focus constituent" (for which see §3.6.3). Example (34a) shows that all arguments are accented. Examples (34b) and (34c) illustrate the adjacency condition on the argument and the predicate: if another AD intervenes, Schmerling's generalization is blocked, but not if the adverbial is unaccented and no AD can be formed (34d).

(34) a. (JOHN)$_{AD}$ (took our DONkey)$_{AD}$ (to the VET)$_{AD}$
      b. (Our DOG died)$_{AD}$
      c. (Our DOG)$_{AD}$ (unexPECtedly)$_{AD}$ (DIED)$_{AD}$
      d. [What happened next?] (Our DOG then died)$_{AD}$

Second, Schmerling contrasted sentences like (34b) and (32b) with what she termed "Topic–Comment Sentences," in which the "sentence stress" is on the predicate, an example of which is (32c). This comparison confounds Schmerling's generalization with "information structure," which is the topic of §4.4.3. Gussenhoven (1983a) proposed that the correct opposition is between "eventive sentences," to which Schmerling's generalization is applicable, and "non-eventive sentences."[3] The proposition in an eventive sentence is meant as an update of the history of the world, while that in a non-eventive sentence is a definition of the world. This makes (32b) enter into a contrast with a defining proposition, as shown in (35a). The same contrast is shown in (35b), this time the more likely reading being the non-eventive one. The implausible eventive reading was noted by Michael Halliday as the interpretation by "[t]he man in the London underground who was worried because he had no dog." The distinction applies equally to cases in which an object argument allows the predicate to be unaccented, as shown in (35c) and (35d) for a Theme and a Goal, respectively. The eventive version in (35c) should be read in context: "The broth made by more than half of our cooks is just awful, so we've decided to take soup off the menu." The non-eventive version is the proverb:

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[3] The observation that intransitive sentences like (32b) and (34b) express an "event" was made independently by Cruttenden (1984).

"if there are too many cooks, . . ." Likewise, the difference between the eventive and non-eventive versions in (35d) lies in the reality of the gift. It is immediate in the eventive case, but represents a rule of life in the non-eventive case.

(35)		*Eventive*	*Non-eventive*
	a.	JOHNson died.	PEOple DIE.
	b.	DOGS must be carried.	DOGS must be CARRIED.
	c.	TOO many COOKS spoil the BROTH.	TOO many COOKS SPOIL the BROTH.
	d.	You must give it to the POOR.	You must GIVE to the POOR.

A third observation about Schmerling's generalization is that it also applies to embedded constructions (Gussenhoven 1992; Winkler 1997). In (36), the Theme of *hear* is the clause *a bird sing*. For the purposes of the higher clause, *a bird sing* is an argument, which must be accented, while *hear* is unaccented. And for the purposes of the lower clause, *bird* must be accented, while *sing* is unaccented. This telescoping of the accentuation requirements is parallel to what happens at the word level: the accent on the first syllable of *lemon* serves to accent the whole word, while this accentuation of the word is what is required for the compound *LEMon grass*. The two-argument verb *hear* contrasts with the three-argument verb *teach* in (36b), where *a bird* and *sing* are its Theme and its Goal, and *sing* must therefore be accented.

(36) a. I HEAR [a BIRD SING]
                      sing   Predicate Deaccentuation
       [I HEAR a BIRD sing]
          hear   Predicate Deaccentuation
       I hear a BIRD sing
    b. [I TAUGHT a BIRD to SING]
          taught   Predicate Deaccentuation
       I taught a BIRD to SING

Predicate Deaccentuation is equally a feature of German (Schmerling 1976; Selkirk 1984). Like all West Germanic languages except English, it is verb-final (barring the V2 rule in main clauses, which places the finite form in second position in the sentence), and it is therefore easier to appreciate the contrasts in (37). The adverbial adjunct *Stunden* 'hours' is not capable of allowing the predicate *gefahren* to be unaccented, but the Goal *nach Hannover* is. Similarly, the German translations of (35d) show the difference in accentuation in a verb that is utterance final.

(37)	a.	Ich bin STUNDen geFAHren.	'I have driven for hours.'
	b.	Ich bin nach hanNOver gefahren.	'I drove to Hannover.'
	c.	Das muss man den ARMen geben.	'You must give that to the poor.'
	d.	Man soll den ARMen GEben.	'You must give to the poor.'

The discussion of Schmerling's generalization, including that in Gussenhoven (1983a), has typically been in the context of accenting and deaccenting for "focus." A more appropriate context is a more general tendency in languages for predicates

to be less prominent than subjects and objects. Nubi Gerund Deaccentuation, illustrated in (13), is a close parallel to Schmerling's generalization. Lekeitio Basque, which has SOV word order, reduces the pitch range of the final verb beyond what would be expected if there was downstep, an obligatory lowering of the pitch range after accented phrases. Example (38a) is an instance of predictable downstep on a noun, but its peak contrasts with the even lower peak on 'will go' in (38b), where the verb is subject to range reduction (Gorka Elordieta, personal communication; for references on Northern Bizkaian Basque, see Elordieta 2007). Or again, in Bengali, the sentence-final verb has obligatory downstep, unless it is contrastively focused (Hayes and Lahiri 1991).

(38)   a. Amáien umiá
           'Amaia's child'

       b. Amáia dxungó da
           'Amaia will go'

Information structure in the usual sense cross-cuts the distinction between eventive and non-eventive sentences. If (39a) is said by a shop assistant to a customer carrying a cat up the escalator, an appropriate response would be for the customer to put her cat down and let it ride the escalator by itself, not to go and exchange it for a dog. That is, the sentence is non-eventive, just like the double-accented sentence in (35b). Likewise (39b), spoken by a doorman to a customer pulling a dog by its collar through the entrance of an establishment where everyone is supposed to carry a dog, the customer cannot just leave the dog outside and go in without it. The sentence is eventive, yet accented on the predicate, but this is because *dogs* is "given" (see further §3.6.3). Halliday's (1967: 38) account of (32b) in terms of a contrast between the "newness" of *dogs* in the eventive version of (35) and its "givenness" in the non-eventive version therefore failed to explain the data.

(39)   a.   Excuse me! DOGS must be carried.   *non-eventive*
       b.   Excuse me! Dogs must be CARRIED.   *eventive*

The difference between eventive and non-eventive sentences may show up in other ways. Dutch uses a dummy subject in eventive transitive sentences with indefinite subjects, as in *Er blaffen HONden* 'DOGS are barking'; the non-eventive does not, as in *HONden BLAFfen* 'DOGS BARK'.

4.4.2   Phatic element deaccenting
Bing (1979, 1984) and Firbas (1980) drew attention to the fact that many right-peripheral elements are unaccented in English, like *as a matter of fact* in *That's not TRUE as a matter of fact*. They can be classed under six headings: time–space markers, cohesion markers, hearer-appeal markers, textual markers, approximatives, and epithets (cf. Gussenhoven 1986).

   Time–space markers are adverbials like *here*, *yesterday*, *not any more*, *this afternoon*, *for a minute*, *the other day*, etc.

(40)   I was reading the PAper the other day . . .

Cohesion markers indicate the relationship of a clause with the preceding context, like *actually*, *of course, thank you very much*, *on the other hand*, as illustrated in (41), which could be uttered in response to an unwelcome request to change seats.

(41)   I'm sitting here very NICEly, thank you very much.

Hearer-appeal markers intend to engage the listener, like vocatives, "softening" expressions like *don't you think*, *eh*, and equal polarity tags (42).

(42)   It's SUCH a cute CHILD, don't you think, Peter?

Textual markers include comment clauses, as in (43a), and reporting clauses, as in (43b). Reporting clauses may be complex, and still show a sustained absence of accents. Unaccented reporting clauses may be integrated in the intonational structure in two ways. They may be included in the intonational phrase, just like comment clauses, in which case any final boundary tone appears after the reporting clause, or be cliticized, in which case the final boundary tone occurs before the reporting clause, to close off the reported direct speech, as well as after it. In the latter option, probable for (43a), there is a noticeable boundary between the reported direct speech and the reporting clause.

(43)   a.   It's tomorrow, I think.
        b.   'Then why not GO there?', he interrupted, no longer feeling he didn't care.

Approximatives are expressions that indicate that information is less than precise. This is a quite varied group, with items like *or more*, *the way he did*, *or something*, *and all that*, *kind of thing*, *in a way*.

(44)   I suppose we all ARE in a way.

Epithets are appositive descriptions, often derogatory, as illustrated in (45). Example (45a) is from Bing (1979). In Gussenhoven (1986: 128), I erroneously argued, contra Bing (1979), that epithets are accented. My confusion was due to the frequent occurrence of a final H% boundary tone in this kind of sentence, added to the fact that, like many reporting clauses, epithets are typically set off from the preceding clause by an intonational phrase boundary. Thus, if *neighbors* in (45a) is giving a falling–rising contour (H*L H%: high pitch on *neigh-* and low-to-high pitch on *-bors*), the pitch on *the finks* will repeat L H%, the low-to-high pitch of *-bors*. To see how the pattern goes without H%, (45b) naturally ends in L%, once after *is* (H*L L%) and once after *boy* (L L%). As Bing pointed out, this pattern contrasts with the repetition of the pitch accent: if the H*L H% is repeated on *the finks*, the expression changes into an appellative apposition, *Fink* now being their surname; see (46b). Similarly, a polar tag is accented, as shown in (46b), where *IS* repeats the contour of *ILL*, H*L L%.

(45)

    a.   My nextdoor NEIGHbors, the finks, have been coming over EVery NIGHT.

    b.   Here he IS, the stupid boy.

(46)

a.   My nextdoor NEIGHbors, the FINKS, will be OUT tonight.

b.   He ISn't ILL then, IS he?

4.4.3 (De)accenting for "newness" and "givenness"

Deaccenting for "givenness" is illustrated in (47a), where the phrase *in the city* is a stand-in for *Toulouse*. The absence of a pitch accent on *city* causes the predicate *set foot* to have the last pitch accent. By contrast, in (47b) *in the city* refers to a specific district in London, and therefore conveys different information from *London*. Pitch accents thus express "information structure," the way the information in the sentence relates to the state of understanding. The lack of accent on *city* in (47a) indicates that reference is made to existing information, just as the presence of the accent on the same word in (47b) indicates that some referent other than "London" is to be understood, i.e. the financial district known as "the City."

(47)   a.   They can't have been seen in Toulouse. They NEVer set FOOT in the city.
       b.   They haven't really seen much of London. They NEVer set foot in the CITy.

The relation between accentuation and information structure in English and other European as well as Asian languages is a widely studied phenomenon. Recent volumes are Bosch and van der Sandt (1999), Molnár and Winkler (2006), and Lee *et al.* (2007). Here I discuss two issues that have played a role in the discussion over the past decades: (i) highlighting and (ii) the focus constituent.

   (i)   *Highlighting*: Dwight Bolinger was the main proponent of the position that a pitch accent lends significance to the word it is used on, even in a compound or a predicate–argument combination. This "highlighting view" was originally launched in reaction to the syntax-based derivation of "normal stress" illustrated in (31a) (Bolinger 1972), but later repeated in response to Schmerling (1976) (Bolinger 1977) and Gussenhoven (1983a) (Bolinger 1985, 1987). The highlighting role of pitch accents is evident not only in the expressive use of pitch accents in (48a) – cf. Bolinger (1987: example (145)), which goes against Predicate Deaccentuation – but also in the unusual locations of pitch accents, "distortion," as in (48b) (Bolinger 1985: example (32)). Counterpresuppositional accentuations like that in (48c), which can be analyzed as representing negative polarity focus, must thus be motivated by the meaning of *in* in Bolinger's analysis (Bolinger 1985).

(48)   a.   Your FEET STINK.
       b.   A: You've overlooked the possibility of dealing with him personally.
            B: Not at all. There never really was a POSsibility.
       c.   They can't have been seen in Toulouse. They were never IN the city.

The expressive power of pitch accents and the expressive motivation for some pitch accent locations is undeniable (cf. also Ladd 2008: 246), but the consensus

is that a blanket "highlighting" account of pitch accent locations in English fails to do justice to the structural element in the distribution of pitch accents. The examples do make it clear, however, that an account of the kind presented here, whereby all accentable syllables are first accented and then judiciously deaccented, will run foul of cases like (48c), where the preposition was never taken to be accented in the first place. The same goes for cases in which the focus constituent (see next section) is smaller than the word. This is illustrated by Bolinger's famous complaint about the quality of a drink: *This whisky wasn't IMported, it was EXported*. Here, the foot structure of [ɪk(spɔːtəd)] is changed to [(ɛk)(spɔːtəd)] to accommodate the pitch accent on the focus constituent *ex-*. In optimality-theoretic terms, accenting for focus is undominated (cf. Truckenbrodt 1995).

(ii) *The focus constituent*: One broad tradition, beginning with Chomsky (1972), defines the focus constituent, marked [FOC] or [+focus], as the "new" part of the sentence (fragment), which contrasts with a "given" part. Chomsky (1972) defined the focus constituent as the "natural" answer to a question, which Jackendoff (1972: 230) interpreted as the constituent that is outside the "presupposition," the information that speaker and hearer in the exchange share. For instance, the prepositional phrase in *He went* [*to the Jameson Court shopping mall*]$_{FOC}$ is the focus constituent if this sentence is the answer to *Where did John go?*, because the notion of 'him going to some place' is the presupposition. This contrast has been described, with varying definitions, as "focus" *vs.* "topic" (Schmerling 1976), "theme" *vs.* "rheme" (Prague School; Steedman 2000), and "focus" *vs.* "background" (Gussenhoven 1983a; Jacobs 1991). In a partial departure from this tradition, Selkirk (1984: 214) abandoned the requirement that question and answer should have the same presupposition, requiring only that the answer should be "appropriate." The difference between these two (classes of) definitions is illustrated in (49), where the "new" focus is labeled "foc1," and the "appropriate" focus (for convenience equated here with the constituent corresponding with the WH-phrase) is labeled "foc2." Importantly, a [foc2] may contain "given" information. It is important to keep the two concepts apart. As tactfully pointed out by Büring (2006), I once criticized a description that was intended to describe the relation between accent and "foc2" for failing to predict the relation between accent and "foc1" (Gussenhoven 1999).

(49) A: It's amazing that Mary managed to carry those heavy wine bottles up the hill to the Hardings' picnic party. What did Sue bring?

    a.   B: Sue brought [some REALly LIGHTweight TABlecloths]$_{foc1,foc2}$
    b.   B: Sue brought [some [PLASTIC]$_{foc1}$ wine bottles]$_{foc2}$
    c.   B: Sue brought [[MY]$_{foc1}$ present]$_{foc2}$
    d.   B: Sue did[n't]$_{foc1}$ BRING [any present]$_{foc2}$

The relation between "newness" and "phrase corresponding to WH-phrase in question" does not follow from a principle of grammar, but from pragmatics: the listener is likely to answer a WH-question by providing the information which is asked for, and this information is very probably "new" (which is why WH-questions provide a good elicitation tool). However, other situations may arise, as shown in (49b)–(49d). If "foc2" is included in the grammar, an account is required to get from accent to "foc2" ("focus projection rules": Höhle 1982; Selkirk 1984,

1995) as well as an account to get from accent (plus "foc2") to "foc1" ("Focus Inter-pretation Rules": Selkirk 1984, 1995). In the Focus-to-Accent account (Gussenhoven 1983a; Ladd 2008), these two rule types coincide; the motivation for "foc2' therefore remains somewhat unclear. Ultimately, the focus constituent will need to be established through behavioral experiments with listeners, such as the con-text retrieval task (Swerts *et al.* 2002) or through eye-tracking experiments (Itô and Speer 2008).

4.5   *Pre-nuclear pitch accents*

While post-focal words are unaccented in English and many other languages, unaccented words before the focus are generally disfavored. It is apparently more natural to accent words than to deaccent them in pre-nuclear positions. But pre-nuclear accents are not all equal. Féry and Ishihara (2009) show that focus-marking pre-nuclear H* pitch accents have higher peaks than other pre-nuclear pitch accents. Significantly, an old experiment in which listeners had to rate the well-formedness of question–answer pairs showed that verbs that are subject to Predicate Deaccentuation are treated differently by listeners than other verbs. Conversations like those in (50) were recorded by pairs of speakers, whose utterances were then cross-spliced: both A1 and A2 were provided with each of the B responses spoken in the A1 and the A2 context, giving four conversations for type (50a) and four for type (50b). Listeners could tell whether the question–answer combina-tions were taken from matching combinations only in the case of (50a). This shows that there was information in the phonetics of *teaches* in the B-responses, which enabled them to tell whether 'teach' had been referred to before. In the combina-tions for (50b), no information was apparently derived from the phonetic shape of *teaches*. In fact, in the case of (50a), judgments correlated with the perceived prominence on *teach*, as one would expect, but those in (50b) did not, even though the variation in perceived stress in (50a) and (50b) was comparable. This suggests that listeners interpret the prominence on *teaches* as focus-marking in (50a), but not in (50b) (Gussenhoven 1983b; Birch and Clifton 1995). To return to Schmerling's minimal pair, (32c) is a case of pre-nuclear accentuation of a presupposed con-stituent, *Truman*, not a constituent that is accented for focus (see also Büring 2006).

(50)   a.   A1:   Where does she teach?
                 A2:   What does she do?
                 B: She teaches/TEACHes in GHAna.

          b.   A1:   What does she teach?
                 A2:   What does she do?
                 B: She teaches/TEACHes linGUIStics.

5   Does PAV explain all prominence distinctions?

The PAV assumes that the prominence patterns of sentences are given by the distribution of pitch accents. This leaves a number of phenomena unaccounted for. First, Ladd (1988) and Féry and Truckenbrodt (2005) showed that the phrasal branching structure of sentences is reflected in the pitch height of phrases. Specifically, when moving into a higher constituent the pitch is higher than when moving into a lower constituent. Thus, B has higher pitch and C has lower pitch

in *A and* [*B and C*] than in [*A and B*] *and C*. Second, Katz and Selkirk (2009) produce evidence that a contrastive accent like that on *Modigliani* in (52) has greater acoustic prominence than the phonetically less salient thematic accent in *Moma*, which Zubizaretta (1998: 84) might call a "miniature" accent. Katz and Selkirk (2009) argue that there is a binary contrast here.

(51)   Gary is a really bad art dealer. He gets attached to the paintings he buys. He acquired a few Picassos and fell in love with them. The same thing happened with a Cezanne painting. So he would *only* offer that [Modigliani]_{FOC} to [MoMA]_{New}. I bet the Picassos would have fetched a much higher price.

The third case concerns "second occurrence focus" (SOF). It refers to the unaccented repetition of a constituent in the scope of a "focus operator" like *also*, *even*, *only* which was accented in the preceding sentence. Féry and Ishihara (2009) found small but significant differences between postnuclear SOF, as illustrated in the B response in (52a), and non-focus, as illustrated in the B response (52b), even though both instances of *song* are unaccented. Their experiment was on German; (52) improvises on the kind of data they used (cf. also Beaver *et al.* 2007).

(52)   a.   A: It was a fun party. Michael even sang a SONG.
            B: And WALdemar even sang a [song].
       b.   A: Did MANy people sing a song at the party?
            B: Yes! WALdemar even sang a song.

Fourth, there may be durational differences and possibly pitch differences between unaccented primary stresses and unaccented secondary stresses. For instance, if we placed the compound *SPANish student* and the phrase *a SPANish STUdent* in a reporting clause (where their accents must disappear), are these structures still different phonetically? And is the answer the same in the case of a minimal pair of single words, like the noun *INterchange* and the verb *INterCHANGE* (cf. Schmerling 1976: 24; Gussenhoven 1991)? Fifth, even though listeners may not use the information, there are reports that narrow focus, shown in (53a), is pronounced differently from broad focus, shown in (53b). Depending on the language, the narrow focus pronunciation may have a longer duration, a steeper slope, a later peak, an earlier peak, or a higher peak (Avesani and Vayra 2004; Smiljanić 2004; Sityaev and House 2004; Baumann *et al.* 2007; Hanssen *et al.* 2008).

(53)   a.   A: Were you going to drive to Bristol, you said?
            B: We're going to drive to [WINDsor].
       b.   A: What are you going to do today?
            B: We're going to [drive to WINDsor].

There are two possible responses to these five (real and potential) effects. One is that the PAV needs to be enriched with a representation of gradient prominence, thus returning to the position in Chomsky and Halle (1968). In the context of the differences in phrasal branching referred to above, Ladd (2008) suggested that this representation should be *tonal*, rather than be in terms of levels of stress. Accordingly, he proposed a tree structure much like the metrical tree

of (7), but with "h" (high) and "l" (low) as labels instead of "s" and "w." Selkirk's (1984) "Pitch Accent First" view was in fact a transitional model between ISV and PAV, in that she enriched the grid with an intonational representation, allowing the location of the pitch accent to influence grid column heights (rather than assuming that the grid was built on the basis of morphosyntactic information and subsequently yielded the prominence pattern of the sentence).

The other response is to dispense with a representation, and to allow the phonetic implementation to be influenced directly by meaning. All five (potential) distinctions outlined above are then theoretically equated with other systematic phonetic differences, in particular those due to word class, like the difference between lexical and function words (Jurafsky *et al.* 2000), word frequency (Gahl 2008), and morphological composition (Port and O'Dell 1985; Warner *et al.* 2004; Turk and Sugahara 2009). This makes them instances of paralinguistic communication, in which there is a direct relation between the strength of the phonetic cue and the intensity of the meaning (Ladd 2008). Taking this view, we should therefore expect speakers to vary in the extent to which they express these paralinguistic meanings, and possibly even in their ability to do so. This is what I believe distinguishes paralinguistics from structural differences: it makes no sense to say that speaker so-and-so is "good at deleting the accent" in a compound like *LEMon grass*, but it does make sense to say that some speaker expresses the difference between contrastive and non-contrastive accentuation well in cases like (51) or (53).[4]

6   Conclusion

English syllables are stressed or unstressed by virtue of their phonological structure: peaks of unstressed syllables contain a reduced vowel or a sonorant consonant, those of stressed syllables contain an unreduced vowel. Stressed syllables are either accented or unaccented. This chapter has attempted to answer the question of which of the stressed syllables in a sentence are accented, and has taken the position that the answer to that question constitutes the answer to the patterning of English sentential stress. This approach was contrasted with a view that takes prominence relations in the word and those in the sentence to be instantiations of the same phonological feature, "stress." Accentuation is in part morphologically determined: *SALamander* has an unaccentable stressed syllable in penultimate position, while *SALaMANca* does not, and *WHITEboard* has an accent only on the first constituent, but *(government) WHITE PAper* on both. Outside the lexicon, a number of deaccenting rules are operative which respond to phonological, syntactic, and information structural factors. Systematic phonetic differences in prominence that cannot be covered by this approach present an explanatory residue, which either call for extended forms of representation or must be explained as the direct expression of meaning in the phonetics.

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[4] Some subtler prominence distinctions are due to constituency differences and are therefore accounted for in the representation, e.g. the difference between the compound *SIN tax*, which consists of two phonological words, and *SYNtax*, which consists of one.

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