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The Role of Vowel Quality in Stress Clash

by

Sandra K. Levey

A dissertation submitted to the Graduate Faculty in Speech and Hearing
Sciences in partial fulfillment of the requirements for the degree of Doctor
of Philosophy, the City University of New York

1999

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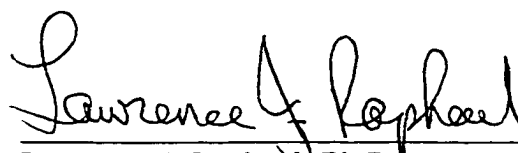
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Abstract

The Role of Vowel Quality in Stress Clash

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Sandra K. Levey

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The effect of stress clash between adjacent primary stressed syllables was examined through perceptual and acoustical analysis. Bisyllabic target words with primary stress on the second syllable were produced in citation form and in sentences by ten adult participants. The selected target words were analyzed for (a) the position of primary stress and (b) the identity of the vowel in the first syllable when produced in citation form. The goal was to determine if primary stress was placed on the final syllable and that the first syllable contained a vowel that could receive primary stress. Words judged to not meet these criteria were eliminated from the corpus. The target words were placed in stress clash contexts (followed by a primary stressed syllable) and in non-clash contexts (followed by a non-primary stressed syllable). The goal was to determine if stress clash resolution would occur, and if so, which of three explanations could account for resolution: (a) stress shift, with primary stress shifted to the first syllable in the target words or stress deletion, with acoustic features reduced in the second syllable in the target

words, (b) pitch accent, taking the form of fundamental frequency, assigned to the first syllable in target words produced in early-sentence position or (c) increased final syllable duration in the target word. Perceptual judgment showed that stress clash was resolved inconsistently in stress clash contexts, and that stress shift also occurred in non-clash contexts. Acoustic analysis showed that fundamental frequency was higher the first syllable of target words when stress shift occurred, and that both syllables of the target words were produced with higher fundamental frequency in early-sentence position. A test of the correlation between perceptual judgments and acoustic results showed that fundamental frequency was potentially the primary acoustic feature that signaled the presence of stress shift.

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Chapter 1

Introduction

The purpose of this study was to identify the speech production strategies and the contextual conditions that facilitate stress shift resolution when it occurs in stress clash contexts. These contextual conditions consist of (a) vowel quality in the first syllable (S1) of the target words, (b) contexts that place the target words in stress clash and in non-clash sites and (c) position of the target words in sentences. Stress clash occurs when two primary stressed syllables fall in sequence in a phrase (Kenstowicz, 1994; Liberman & Prince, 1977). For example, there is a clash between the second syllable (S2) of the word *raccoon* /rae kún/ and the first syllable (S1) of the following word in the phrase *raccoon coat* /rae kún kót/. Based on the hypothesized preference toward a strong-weak (SW) stress pattern in phrases and sentences, it is claimed that speakers frequently avoid stress clash to reestablish an alternating SW pattern (e.g., /rae kun kót/) (Kenstowicz, 1994). It has been proposed that an alternating pattern of SW syllables is preserved by a Rhythm Rule (Kenstowicz, 1994; Liberman & Prince, 1977; Prince, 1983).

The Rhythm Rule can be described as a process that reestablishes a SW pattern to avoid stress clash. There are, however, exceptions to the Rhythm Rule. For example, stress clash is maintained in the phrase *maroon coat* /mərún kót/. This is because the vowel schwa in S1 is unable to receive stress (Kenstowicz, 1994). Stress clash, however, is also maintained in the phrase *obese mailmen* /obis mélmɛn/ in spite of the presence of a full vowel in S1 of the word *obese* (Gussenhoven, 1991). The difference between the

change in the word *raccoon* and the lack of change in the word *obese* suggests that an examination of the role of the vowels in S1 of target words is warranted in the investigation of stress clash.

There are three explanations of how stress clash is resolved: (a) stress shifts from the primary stressed final syllable in the target word to an earlier syllable in the word (Grabe & Warren, 1995; Liberman & Prince, 1977) or stress is deleted in the final syllable of the target word (Gussenhoven, 1991; Horne, 1990; Nespor & Vogel, 1989; Vogel, Bunnell, & Hoskins, 1995); (b) the patterns of stresses in a sentence is rhythmically assigned (Hayes, 1984; 1995; Selkirk, 1984) or the duration of the final syllable of the first word in the stress clash sequence is increased (Selkirk, 1984); (c) pitch accent, taking the form of fundamental frequency, is assigned to the first syllable that contains a full vowel in a sentence and to the last full vowel in the sentence that carries a primary accent (Bolinger, 1955; 1958; Shattuck-Hufnagel, 1995). These explanations share two assumptions: (a) only a full or an unreduced vowel can receive stress and (b) primary stressed vowels cannot be allowed to follow one another in a phrase (Bolinger, 1955; Kenstowicz, 1994; Liberman & Prince, 1977). There is also the point of view that maintains that stress clash is not resolved in any manner (Cooper & Eady, 1986; Dainora & Hemphill, 1997).

In the current study, the term *stress* is defined as the perceived prominence of a syllable in a word, cued by the acoustic features of fundamental frequency, duration, and intensity (Borden, Harris, & Raphael, 1994). Pitch accent is cued by the acoustic feature of fundamental frequency. Hayes (1995) maintains that pitch accent is determined by the intonational system at the sentence level. Only full vowels are assigned pitch accent, with

pitch accent falling on an early and a final syllable in a sentence (e.g., SAN Francisco Golden Gate BRIDGE). In this example, the syllable *-San* is assigned initial pitch accent and the word *Bridge* is assigned final pitch accent or the nuclear accent in this phrase (Bolinger, 1955).

The assignment of primary stress determines the quality of the vowel in a syllable. For example, S2 in the word *telegraph* is produced with the vowel schwa in S2, however, in the form *telegraphy* /təˈlɛɡəfi/, the location of stress on S2 changes the surface form of this vowel to that of the underlying presentation, /ɛ/. Therefore, this syllable is able to receive accent. In contrast, the vowel in S1 of the word *maroon* consists of only the unstressable vowel schwa in its underlying representation.

A syllable in a word possesses primary stress when the acoustic features cause it to be perceived as more prominent than any other syllable in that word. A syllable may be perceived as stressed when one or more of these acoustic features is manipulated by a speaker. The stress pattern in English words can be characterized by three degrees of syllable stress (Kenstowicz, 1994) (primary, secondary, or weak stress), although Chomsky and Halle (1968) posit five degrees of stress in English, with 1 marking the primary stress, 4 marking the weakest stress, and 5 marking the unstressed syllables. In the example of four levels of stress in the word *documentation*, S1 (*doc-*) is marked with stress 3, S3 is marked with stress 4 (*-men-*), and S4 is marked with stress 1.

This study tested the assumption that stress clash is resolved. There have been few carefully controlled empirical studies to verify this assumption. In addition, this study attempted to determine (a) if vowel quality plays a role in stress clash resolution, (b) if contextual effects play a role when stress clash is resolved (or is not resolved), (c) if the

position of the target word in sentences plays a role when stress clash is resolved, (d) if pitch accent plays a role when stress clash is resolved, and (e) if there are changes in specific acoustic features when stress clash is resolved (i.e., changes in fundamental frequency and/or in duration and/or in intensity).

Chapter 2

Review of the Literature

Explanation I: Active Processes in Stress Clash Avoidance

The first explanation of stress clash resolution proposes that active processes reestablish a SW pattern in phrases (Gussenhoven, 1991; Horne, 1990; Kenstowicz, 1994; Liberman & Prince, 1977; Nespors & Vogel, 1989; Vogel, Bunnell, & Hoskins, 1995). This change in the stress pattern of the citation form of a word is brought about by either (a) stress shift from the final syllable to an earlier syllable in the first word in the sequence (Grabe & Warren, 1995; Liberman & Prince, 1977) or (b) stress deletion or reduction of the acoustic features that cue stress in the final syllable of the first word in the sequence (Gussenhoven, 1991; Horne, 1990; Nespors & Vogel, 1989; Vogel, Bunnell, & Hoskins, 1995). When stress shift occurs, primary stress is posited to shift from the second syllable (S2) to the first syllable (S1) in the word. When stress deletion occurs, the rhythm rule operates to reduce fundamental frequency in the primary stressed syllable (Gussenhoven, 1991). Thus, the degree of stress on S2 of the word *raccoon* would be reduced when it is followed by a syllable that contains primary stress. It is further posited that no changes occur in the acoustic features that cue stress in the other syllables in this word (Gussenhoven, 1991; Horne, 1990). Listeners, however, may perceive relatively greater stress on the first syllable than on second syllable of the word because S1 is now perceived to be more prominent (Horne, 1990). Most of these studies (Gussenhoven, 1991;

Kenstowicz, 1994; Nespov & Vogel, 1989) did not include an empirical investigation of the specific acoustic features that are manipulated to resolve stress clash.

This first explanation of stress clash resolution is based on the predictions of metrical theory. Metrical theory posits a hierarchy of syllable prominence that may be displayed on a grid (see Figure 1). In Figure 1(a and b), positions with the potential for stress placement are determined in line 0 of the metrical grid. These positions are marked by an X. An X is assigned to each vowel in each syllable at this level. In line 1, the foot level, the stronger syllables in the citation form of words are determined. In line 2, the word level, the syllable with primary stress in the citation form of each word is determined. In this case, the word *thirteen* would receive primary stress on S2 and the word *women* would receive primary stress on S1. The presence of stress clash is also determined at this level, based on the adjacency of primary stress in the final syllable of the first word in the phrase and in the first syllable of the second word in the same phrase (e.g., *thirtéén wómen*). At this level, main stress shifts from S2 to S1 in the word *thirteen* (stress shift, Figure 1a) or is deleted in S2 (stress deletion, Figure 1b) of this word. In line 3, the phrase level, the strongest syllable in the phrase is determined and this syllable is assigned the highest level of stress (nuclear stress) according to the Nuclear Stress Rule (Kenstowicz, 1994). In the metrical grid, strong syllables are assigned higher levels in the grid. Relative prominence, or the degree to which a syllable stands out from other syllables, is determined by the reassignment of stress at each cyclic level.

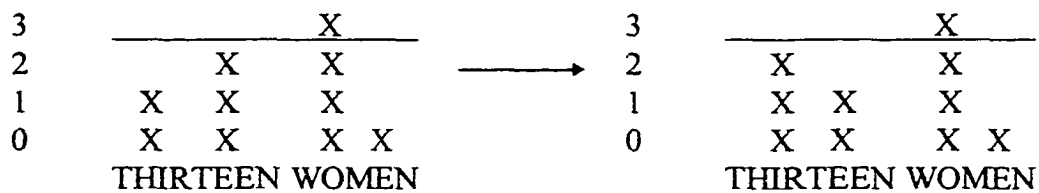
The metrical grid portrays phonological processes in a manner that does not include the acoustic factors that underlie phonology: Each “X” indicates only a level of stress, but does not refer to the acoustic features that may characterize that level. The

Stress Clash

Unresolved

Resolved

a. Stress Shift



b. Stress Deletion

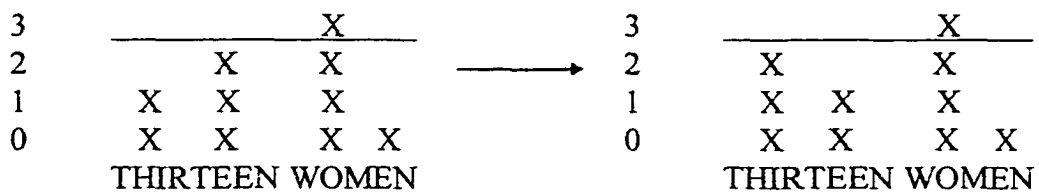


Figure 1. A metrical grid displaying stress clash on level 2 with clash between S2 of the first word in the series and S1 of the second word in the sequence. Stress clash is based on adjacency of stress assignment to syllables at this level in the grid. (a) In stress shift, primary stress shifts to S1 in the first word in the sequence. (b) In stress deletion, stress is reduced in S2 of the first word in the sequence.

metrical grid also separates phonology from the semantic factors that condition the acoustic features: A speaker may mark a certain syllable for prominence to express intent or to differentiate between meanings (i.e., INsert vs. inSERT). Pragmatic or semantic factors may, therefore, operate in a manner independent of the phonological processes predicted by the metrical grid. This may be viewed as a potential weakness of the metrical model. Liberman and Prince (1977) argue that stress clash remains unresolved in contexts that would change the meaning of the words.

Condition 1 presents [sic] (prevents) the rule from shifting the “nuclear syllable” of an intonational phrase; without this limitation, it is interesting to note, the unbridled pursuit of trochaic fluency would drastically change the meaning of many utterances. However, even if the shift would take place within a single word, the nuclear syllable is generally exempt from being affected by this rule, so that an expert of the Chinese language is a *Chinése-expert*, not a *Chinese-expert*, even though a stress clash remains, in our terms (p. 319).

The Rhythm Rule will not operate to resolve stress clash when a speaker has employed contrastive stress to convey meaning or when a phrase contains a syllable that has been assigned nuclear stress (Grabe & Warren, 1995; Liberman & Prince, 1977). Contrastive stress is used to emphasize a specific syllable or a word in a phrase or a sentence. Contrastive stress is employed in the phrase “*A mailMAN came*” / Δ mèlmáen kém/ in answer to the question, *did a mailMAN or a mailWOMan come today?* In this example, stress clash is maintained when the word *mailman* precedes the word *came*.

Contrastive stress overrides the stress assignment in the underlying representation when a speaker attempts to place prominence on a particular syllable or word in a phrase.

Nuclear stress is carried by a syllable that has been assigned maximal prominence. In the citation production of the word *Massachusetts*, nuclear stress is assigned to S3. If this word is produced in a phrase, nuclear stress may be assigned to another syllable in that phrase. Nuclear stress is assigned to a late-occurring syllable in the phrase that carries primary stress (Cruttenden, 1997; Shattuck-Hufnagel, 1994) or it is assigned to the main-stressed syllable of a word in that phrase (Shattuck-Hufnagel, 1994). Primary stress in a syllable will not shift if it has been assigned nuclear stress (Grabe & Warren, 1995; Liberman & Prince, 1977; Shattuck-Hufnagel, 1994). For example, if nuclear stress is assigned to S2 in the word *raccoon*, primary stress will not shift to an earlier syllable if that word is followed by a primary stressed syllable in a stress clash context.

In contradiction to the predictions of metrical theory, both early prominence and stress shift to an earlier-occurring syllable in the word have been perceived even when words were placed in non-clash contexts (Cooper & Eady, 1986; Shattuck-Hufnagel, Ostendorf, and Ross, 1994; Vogel, Bunnell & And Hoskins, 1995). Vogel, Bunnell, and Hoskins (1995) found that listeners perceived primary stress in S1 when the target word was produced in both clash contexts (i.e., *Chinese clients*) and in non-clash contexts (*Chinese cadets*).

The perception of stress shift may be confounded by the effect of context. Grabe and Warren (1995) excised target words that had been judged as shifted in stress clash contexts from the experimental sentences (e.g., *I get moderately entertained by all sorts of programs, but, when my father watches TV soaps, he is happy*). The trigger to stress

clash (i.e., *soaps*) was deleted, and the resulting phrases were presented to the same listeners in two contexts: (a) the target word alone, without the preceding and the following context (*TV*) and (b) the preceding phrase plus the target word (e.g., *I get moderately entertained by all sorts of programs, but when my father watches TV...*), with “*he is happy*” excluded. Results showed that stress was judged as shifted 67% of the time when the trigger (e.g., *soaps*) was absent (e.g., *I get moderately entertained by all sorts of programs, but, when my father watches TV...*) versus 100% of the time when these words were presented in a sentence context (e.g., *I get moderately entertained by all sorts of programs, but, when my father watches TV soaps, he is happy*). In addition, the primary stress of the target word was judged as shifted only 38% of the time when it was presented with no context (i.e., *TV* alone). These results indicate that context can provide a cue to the location of primary stress and that phonological, not phonetic, factors are key in the perception of stress shift. In addition, these results suggest that intonational factors play a role in the perception of stress shift.

Bolinger (1958) provided additional support for the idea that contexts may play a role in the judgment of primary stress. Experienced listeners were asked to identify the word that carried main stress in a sentence. The syllables that were judged to carry pitch prominence were marked by pitch movement *up to* the target word (a rise in pitch before or on the target word), by pitch movement *down to* the target word (a drop in pitch before the target word), by pitch movement *down from* the target word (a drop in pitch within the target word), or by pitch movement *up within* the target word (a rise in pitch within the syllable). These results indicate that the primary stress of an excised word may not be perceived as shifted if context plays a role in the perception of primary stress.

Finally, Grabe and Warren (1995) found that acoustic analysis did not support trained listeners' judgments of stress shift in target words. In contrast to the perception of stress shift in stress clash contexts, these investigators found that S1 in the target words had higher fundamental frequency than S2 in both shifted and non-shifted cases. These results support the notion that both perceptual and acoustical analysis are necessary when investigating stress clash resolution.

In summary, the advocates of a metrical model argue that stress clash is resolved when two primary stressed syllables fall in sequence in a phrase. However, investigators have found that primary stress in S1 has been perceived when S2-stressed words were placed in both stress-clash and in non-clash contexts (Grabe & Warren, 1995; Vogel, Bunnell, and Hoskins, 1995). Other investigators have found the absence of acoustic support for the perception of stress shift (Cooper & Eady, 1986; Grabe & Warren, 1995). Investigators have also found that context plays a role in the judgment of stress shift in S2-stressed words. In one case, words that had been identified as shifted were no longer identified as shifted when excised from sentences (Grabe & Warren, 1995). In another case, S1 of S2-stressed words was found to have higher fundamental frequency in both clash context and in non-clash contexts when target words were placed in sentence-initial position (Cooper & Eady, 1986). The results found in earlier stress clash studies strongly suggest that investigations must control for the position of target words in experimental sentences and the use of both perceptual and acoustic analysis.

Explanation II: Rhythmic Assignment

According to the rhythmic explanation (Hayes, 1984; Selkirk, 1984), stress clash is averted by the inherent rhythmic nature of stress assignment. These rhythmic characteristics prevent the occurrence of stress clash through the even spacing of stress throughout the phrase. The re-establishment of an alternating strong-weak stress pattern is the principal feature of rhythmic stress assignment. According to Hayes (1995), stress is rhythmically distributed when it is placed at approximately equal distances in words and in phrases. For example, stress is evenly spaced on the first, third, and fifth syllables in the word *Apalachicola* /æpələetʃəkólə/.

In Hayes' (1984) view of stress clash avoidance, certain stress intervals are resistant to changes in stress patterns in a stress clash context. In the phrase *Mississippi Mabel*, it is proposed that there is a clash between the stressed syllable of the first word (i.e., -sí-) and the following word (i.e., *Mábel*) because there is no four-syllable interval between the syllables assigned primary stress. Therefore, primary stress would shift to S1 (e.g., *Mississippi Mábel*) to increase the interval between primary stresses and to satisfy the condition set by the Quadrisyllabic Rule that there must be a four-syllable interval between syllables that are assigned primary stress. In the phrase *Minneapolis Mike*, there is a clash between the stressed syllable of the first word (i.e., - á -) and the following word (i.e., *Mike*). Stress shift is posited to be less likely to occur in this phrase because the resulting interval between the syllables assigned primary stress would be five (e.g., primary stress assigned to S1 in the word *Minneapolis* and to *Mike*). It should be noted that this view of stress clash differs from the view of stress in the current study. In the current study, stress clash results from immediate adjacency of two primary stressed syllables. For

example, there are no intervening syllables between the stressed syllable for the target word and the following primary stressed syllable in *raccoon coat*.

Disyllabic interstress intervals are also hypothesized by Hayes (1984) to be less resistant to changes in stress patterns (e.g., *ànalýtic thóught*, in which primary stress is shifted to S1: *áanal`ytic thóught*). Trisyllabic interstress intervals, however, are hypothesized to be more resistant to shift (e.g., *ànalýtical thóught*) because neither a three-syllable interval (i.e., *ànalýtical thóught*) nor a five-syllable interval (i.e., *ánalytical thóught*) fulfills the ideal of evenly spaced stress.

The Rhythm rule can operate to lengthen the duration of the final syllable of the first word in a stress clash context to increase eurhythmy (Hayes, 1984). Selkirk (1984) argues that the Rhythm Rule resolves a dysrhythmic syllable pattern either by (a) increasing the duration of the final syllable in the first word of a stress clash context (e.g., *-coon* in the phrase *raccoon coat*) or by (b) insertion of a pause between the final syllable of the first word in the series and the following stressed syllable (e.g., a pause between the *raccoon* and the word *coat* in the phrase *raccoon coat*). In Figure 2, the phrase *raccoon coat* is represented in a metrical grid that marks points in time (Selkirk, 1984). The ideal metrical pattern consists of the rhythmic pattern of stressed syllables followed by unstressed syllables. Stress clash resolution acts to reestablish this ideal metrical pattern when it is disturbed. In the case of beat addition (see Figure 2a), the phrase *raccoon coat* would be produced with longer duration of S2 in the word *raccoon* /rækú:n kót/. In the case of pause addition (see Figure 2b), Selkirk argues that a silent beat is inserted between S2 of the word *raccoon* and the word *coat*. Selkirk posits that a pause can be described as a position that is unaligned with the points in time in the metrical grid.

a. Beat addition

X	XX		X
RA	COON:		COAT

b. Pause addition

X	X	<u>X</u>	X
RA	COON		COAT

c. Pause addition and beat insertion

X	XX	<u>X</u>	X
RA	COON:		COAT

Figure 2. A truncated metrical grid displays the potential for stress clash between S2 of the word *raccoon* and the word *coat*. This time-based representation of the grid presents the processes of (a) beat addition, (b) pause addition, with the unaligned beats represented by underlined *x* markers that indicate a pause and (c) both beat and pause addition.

A third possibility (see Figure 2c) is that both beat addition and pause addition co-occur. In the stress clash context shown in Figure 2, a silent beat is inserted between S2 in *raccoon* and the word *coat*, which might be evident in perceptual and in acoustic analysis (see Figure 2b and 2c).

Dainora and Hemphill (1997) tested the metrical theory prediction of stress shift by comparing the acoustic features of words produced in citation form and in phrases. These investigators also attempted to test the notion of final syllable lengthening in stress clash contexts (Selkirk, 1984) and the notion of prominence organized according to evenly spaced intervals (Hayes, 1984). The citation form of the word *twenty-one* was placed in stress clash phrases (e.g., *twenty-one points*) and in non-stress clash phrases (e.g., *twenty-one potatoes*). The acoustic stress features of the target word produced in citation form were compared to those of the word produced in a phrase. These authors argued that this comparison would provide the most stringent test of the predictions of metrical theory. Participants were asked to memorize the target words (e.g., *good-looking*, *twenty-one*, *microscopic*, *sub-atomic*, *South-Chicago*, and *residential*). Next, the target words were produced in two ways: in response to questions that elicited target words (e.g., *Who runs down the beach in Baywatch?*) or in a word association task (e.g., *In Baywatch, is there an ugly lifeguard?* with *good-looking lifeguard* as the expected response).

In the first experiment, the target words were placed in stress clash contexts, as defined by these investigators (e.g., *good-looking lifeguard*) versus non-clash contexts (e.g., *good-looking librarian*). Results showed that S1 in the stress clash context had higher fundamental frequency and intensity values than S2. In non-clash contexts, fundamental frequency was greater in S2 than in S1 with no statistically significant

difference between these syllables. There were no significant duration differences between S1 and S2 in either context. S1 and S2 did not differ in mean duration, intensity, and fundamental frequency values across contexts (e.g., the syllables produced in stress clash contexts vs. non-clash contexts). A comparison was also made between the target words produced in citation form and with their counterparts in stress clash contexts. There were no differences between S1 in stress clash contexts and S1 in citation forms. However, S2 was produced with significantly higher fundamental frequency in the stress clash contexts than in the citation forms. With this one exception, acoustic analysis revealed no significant differences between the acoustic features in the citation form of target words and the production of the target word in a stress clash context.

In summary, the available empirical evidence indicates that rhythmic assignment may not provide an adequate explanation for stress clash avoidance. No evidence of compensatory lengthening or of pausing to resolve stress clash has been found (Cooper & Eady, 1986; Dainora & Hemphill, 1997; Grabe & Warren, 1995). In addition, there is no empirical evidence for the hypothesis (Hayes, 1984) that prominence is distributed at evenly-spaced intervals (Cooper & Eady, 1986; Dainora & Hemphill, 1997).

Explanation III: Pitch Accent

The theory of pitch accent (Bolinger, 1955; 1958; 1986; Shattuck-Hufnagel, 1995) posits that syllable prominence is a function of fundamental frequency. In this explanation, stress clash is automatically averted when pitch accent is assigned to syllables that contain the first full vowel and the last full vowel in a phrase. Avoidance processes, such as stress shift, are unnecessary because of the widely-separated assignment of stress prominence.

Pitch accent can be assigned to any full vowel, as long as it does not occur after any primary stressed syllable in the phrase. Vowel quality or vowel identity plays a primary conditioning role and fundamental frequency is the main acoustic feature that is manipulated to resolve stress clash. In a lengthy phrase, however, stress clash may occur in spite of the assignment of pitch accent. Given the sentence *The raccoon coats are on the fourteenth floor in Macy's*, pitch accent would be assigned to S1 in the word *raccoon* and S1 in the word *Macy's* may be assigned nuclear stress (late pitch accent). In this case, stress clash resolution may not occur (e.g., *fourteenth floor*). If pitch accent and stress shift are different processes, then stress clash may not be resolved between the two points of pitch accent assignment.

Bolinger (1989) refers to a hat pattern to describe the assignment of pitch accents or fundamental frequency used to mark prominence in a phrase or in a sentence. In this pattern, pitch accents are assigned to two items in the phrase or the sentence: The theme and the rheme. The first pitch accent is assigned to the theme, or an early-occurring word in the phrase that may carry no new information in discourse. The second pitch accent is assigned to a late-occurring element in the phrase that may carry more information than the earlier word. For example, if a listener is asked *Did Jóhn buy Dundee mármalade?* and responds, *No, John bought Dúndee tártan, John* would function as old information and *tartan* would function as new information.

Pitch accent can be assigned to a syllable that carries secondary or primary stress in a word (Bolinger, 1986). If the phrase *raccoon coat* occurred in sentence-early position (e.g., *The raccoon coat was warm*), S1 of the word *raccoon* would become eligible for pitch accent assignment because of (a) the presence of a full vowel in this syllable and (b)

the position of this syllable as the first full vowel in the phrase. This explanation of sentence prominence includes the factors of speaker interest and pitch accent. Speakers apply emphasis or prominence to a word in a sentence that they intend to stand out. The pitch accent hypothesis provides a semantic and/or pragmatic basis to stress clash resolution. In this explanation, a connection is drawn between phonology and semantics.

Pitch accent assignment may be difficult to distinguish from the process of stress shift. In the citation form of the word *Japanese*, secondary stress is placed on S1 and primary stress is placed on S3 /dʒæpəˈniːz/. Placed in phrase-early position, S1 becomes eligible for pitch accent assignment because the vowel in S1 that is able to receive stress assignment (e.g., *The Japanese boats* /ðə dʒæpəˈniːz bóts/). In this case, pitch accent would be assigned to S1 because of its position in the phrase and not because of stress clash between the final syllable of the word *Japanese* and the word *boats*. Any changes in the stress pattern of the citation form of the word *Japanese* could have resulted from either stress shift (shift from the final syllable in the word to an earlier full vowel) or pitch accent assignment (assignment of fundamental frequency to the first full vowel in the word).

Evidence for the assignment of pitch accent was found in Hayes' (1984) analysis of the stress patterns in utterances that were longer than a phrase. He found that secondary stress was placed as early as possible and primary stress was placed as late as possible in lengthy phrases (i.e., *Topics in the theory of generative grammar* /təpɪks ɪn ðə θɪri əf ɡenəreɪtɪv ɡræməɪ/. The predicted rhythmic alternation was absent in these lengthier

contexts. Instead, stress patterns were consistent with pitch accent assignment to the first full vowel in the phrase.

It may be difficult to distinguish between stress shift and pitch accent assignment if investigators do not control for position effects. Vogel, Bunnell, and Hoskins (1995) reported a small difference in the mean of the percentage of perceptual judgments of final syllable stress between target words in stress clash contexts (21.6 %) and in non-clash contexts (20.0 %). The appearance of stress shift in non-clash contexts may have resulted from the assignment of pitch accent to S1 of the target words placed in early-phrase position (e.g., *Thirteen clients called at noon* and *Chinese colleagues work the most*). In these cases, the target word was eligible for pitch accent assignment because S1 contained the first full vowel in the phrase.

Shattuck-Hufnagel, Ostendorf, and Ross (1994) also found the perception of early prominence even when target words were produced in non-clash contexts. In their study, a trained listener orthographically transcribed 13,728 of the recorded words produced by two female speakers in a radio broadcast. Subsequently, the recorded productions were labeled for prosodic patterns by multiple listeners working as a group. Auditory-perceptual judgments were made with access to fundamental frequency displays, which may have influenced judgments. Disagreements were discussed before assigning stress. The analysis that was carried out with access to the fundamental frequency visual display resulted in changes to the initial perceptual judgments. These changes were reported to involve adding an accent to a word, resulting in double accents. The investigators then consulted a dictionary to establish the identity of vowels and the stressed syllable of 244 stimuli words. Candidate words were eliminated if listed with alternative pronunciations

with primary stress on an early syllable. The transcribed productions were hand-labeled for prosodic patterns within intermediate intonational phrases. According to the TOBI protocols (Silverman et al., 1992), an utterance is composed of one (or more) intonational phrases. Intonational phrases are composed of one (or more) phonological phrases. Each phonological phrase contains at least one pitch accent.

Investigators perceptually analyzed the position of pitch accent. Trained listeners marked the syllables in words that contained the highest or the lowest pitch, and this syllable was labeled as prominent. Listeners also recorded the frequency pattern (i.e., rising or falling) that followed the syllable marked as prominent. Acoustic analysis of fundamental frequency and duration followed perceptual analysis. Shattuck-Hufnagel, Ostendorf, and Ross (1994) found that 28% of the words were marked for early prominence (shifted from the primary stressed final syllable). Target words that were produced in phrase-initial position were judged to possess early prominence more frequently than words produced in phrase-medial position (75% vs. 56%). In addition, a greater number of words with early prominence was produced in non-clash contexts than in stress clash contexts (72% vs. 31%). *Massachusetts* was the only word acoustically analyzed to ascertain the possible cause of the judgment of prominence of S1. The perception of prominence correlated with a rise in fundamental frequency on S1 (*Ma-*) and a 20 Hz fall on the formerly primary stressed syllable /tʃu/. Duration played no role in prominence. However, the durations of syllables that were judged to be prominent in the word *Massachusetts* were shorter in stress clash contexts than in non-clash contexts, regardless of whether or not stress shifted to resolve stress clash. It was concluded that either duration is reduced in stress clash contexts or the assignment of nuclear stress (in

non-clash contexts) resulted in lengthening of these syllables. The experimenters argued for an integrated model to explain stress clash avoidance. In this model, rhythmic considerations influence the location of pitch accent. A speaker will assign pitch accent to an early-occurring syllable to a word in a phrase to maintain distance between syllables that contain primary stress.

Other investigators (Vogel, Bunnell, and Hoskins, 1995) found significant reduction in duration and fundamental frequency of S2 in stress clash versus non-clash contexts when target words (*thirteen*, *seventeen*, *Chinese*, and *Japanese*) were placed in stress clash and non-clash contexts. The duration of S1 showed a small increase in stress clash versus non-clash contexts (i.e., 97.7 ms vs. 97.1 ms) while the mean duration of S2 decreased (i.e., 122.9 ms vs. 130.4 ms). A comparison between S1 and S2 in stress clash versus non-clash contexts showed that there was a small difference in fundamental frequency for S1 (125.7 Hz vs. 126.0 Hz) but there was a small decrease in fundamental frequency for S2 (125.2 Hz vs. 126.6 Hz). The decreased duration and fundamental frequency of S2 were found to be significant in stress clash contexts for the four words that were used in these experiments. These results contradict the hypothesis that S1 plays a role in stress clash resolution.

Horne (1990) examined the rhythm rule in the production of four target words in four contexts: (a) citation form (e.g., *Dundee*), (b) focal or new information in a phrase (e.g., *He said Dundee tartan I think*) (c) prefocal or given information in a phrase (e.g., *No, he bought some Dundee tartan I think*, produced to answer the question *Did he buy some Dundee marmalade?*), and (d) postfocal or information that followed the focal word in the phrase (e.g., *No, I DIDN'T buy any Dundee tartan yesterday*). The hypothesis of

this investigation was that all pitch accents would be deleted after the word that carried new information because pitch accent would be assigned to the head of the phrase that functioned to carry the new piece of information. In this case, fundamental frequency would not rise on the target word, and the two other acoustic features (duration and intensity) could be analyzed. The target words *Dundee*, *canteen*, *postpone*, and *maintain* were produced in citation form and in stress clash contexts (e.g., *Dundee tartan*, *canteen cook*, *postpone meeting*, and *maintain road*). When the target word was in the focal position in a phrase, fundamental frequency was higher in S1 than in S2 when compared to the production of the target words in citation form. In this case, fundamental frequency was higher in S2 than in S1. Duration was consistently less in S2 and intensity varied unsystematically across both syllables. The S1 in the target word received pitch accent when the word was in the prefocal position. When the target word was produced in postfocal position, S1 had greater duration than S2 (except for *postpone*) and intensity of S1 was greater than S2. Fundamental frequency was not measured in this case based on the hypothesis that all accents are deleted in postfocal position.

Other investigators (Vogel, Bunnell, & Hoskins, 1995) found reduced fundamental frequency in S1 of the word *Japanese* when this word was placed in the phrase *Jack's Japanese canoe*. It was hypothesized that a syllable would not be able to receive primary stress if pitch accent fell on the word *Jack's* and nuclear stress fell on S2 of the word *canoe* (Shattuck-Hufnagel, 1995). However, only four target words were used to examine stress clash effects (*thirteen*, *Chinese*, *seventeen*, and *Japanese*). Stress clash studies require contextual control and a greater number of words for greater validity. In addition, placing words in a limited set of phrase positions may not assure validity. The position of

the target word following a candidate for primary stress may have prevented the occurrence of stress clash resolution.

In summary, investigators have found higher fundamental frequency for S1 when target words were placed in early-sentence position in both stress clash and in non-clash contexts (Cooper & Eady, 1986; Shattuck-Hufnagel, Ostendorf, & Ross, 1995). Results of these studies suggest that pitch accent may play a role in stress clash resolution. In contrast, other investigators have not found empirical evidence of stress shift may be absent (Vogel, Bunnell, & Hoskins, 1995; Grabe & Warren, 1995). Empirical evidence, however, has been provided to dismiss the notions that (a) there is an increase in duration for the final syllable in target words and that (b) there is a pause inserted between primary stressed adjacent syllables to resolve stress clash (Dainora & Hemphill, 1997; Cooper & Eady, 1986; Shattuck-Hufnagel, Ostendorf, & Ross, 1994).

Position IV: Stress Clash is not Avoided

Other investigators argue that neither stress clash avoidance (Cooper & Eady, 1986) nor inherent rhythmic patterns (Dainora & Hemphill, 1997) act to prevent the occurrence of stress clash. Stress shift to S1 from S2 of target words was not perceived nor was acoustic evidence found that might underlie stress shift to the first syllables of words placed in stress clash contexts (Cooper & Eady, 1986). This finding, however, is mitigated because the authors analyzed only the acoustic qualities of S1. Therefore, only the possible landing site of stress shift was investigated and the possibility of stress reduction in S2 of the target words was ignored. For example, if stress shift had been

perceived, the reduction of acoustic features in S2 may have been responsible for stress shift judgments.

Cooper and Eady (1986) investigated stress clash resolution through perceptual and/or acoustic analysis in five experiments. Perceptual data were judged by one trained listener. There were 8 to 19 different speakers used in each experiment. In the first experiment, target words (e.g., *Chris*) were placed in a stress clash context (e.g., *Chris Burn*) and a non-clash context (e.g., *Chris Burninski*) in sentences (e.g., *Tom introduced Chris Burn/Burninski to his sister*). The durations of target words were measured acoustically. Contrary to Selkirk's (1984) prediction, results showed that the duration of the target word *Chris* decreased in stress clash contexts, with a 20 ms non-significant difference between stress clash and non-clash contexts. In the second experiment, target words were placed in phrase-final position, preceding a trigger (*If Randy gives trumpet lessons to Chris, Juan will ask them to conduct their sessions in the den upstairs.*) or a non-trigger to stress clash (*If randy gives trumpet lessons to Chris, Juanita will ask them to conduct their sessions in the den upstairs*). Acoustic analysis showed a trend toward longer duration of the target word *Chris* in the stress clash context, but the difference between stress clash and non-clash contexts was not significant. Contrary to Selkirk's (1984) proposal for stress clash resolution, there was no evidence for the insertion of a pause between the final syllable of the first word in the series and the following stressed syllable.

In the third experiment, the rhythmic assignment of stress patterns was investigated to test Hayes' (1984) prediction for the eurhythmic assignment of stress (i.e., that stress would fall at least four syllables apart in phrases). Perceptual analysis of production

revealed that primary stress was judged to fall on S1 of target words in both stress clash contexts (*Pennsylvania relatives*) and in non-clash contexts (*Pennsylvania abbreviations*). The acoustic analysis of the duration of S1 and the fundamental frequency of S1 and S3 in the target word (*Pennsylvania*) revealed that primary stress was produced on S1 of the target word in both stress clash and in non-clash contexts. There were no differences found for duration or for the even (i.e., eurhythmic) assignment of stress.

In the fourth experiment, the phrases from experiment three were placed in sentences (e.g., *Pennsylvania relatives/connections/legislation/abbreviations is/are especially difficult to organize*). Perceptual analysis revealed that primary stress was judged to fall on S1 and on S3 of the target word (*Pennsylvania*) in stress clash and in non-clash contexts. Acoustic analysis revealed a significant effect for fundamental frequency on S1 and S3 with no effect for context. There was a significant effect in the wrong direction for S1 for both duration and for fundamental frequency. This effect showed that the fundamental frequency of S1 and S3 were significantly higher in the non-clash context than in the clash context (e.g., before the word *abbreviation* than before the word *relatives*). Fundamental frequency was, however, significantly higher for S1 and S3 in sentence-initial position than in sentence-medial position.

In the fifth experiment, target words were placed in stress clash (e.g., *thirteen blackboards*) and in non-clash contexts (e.g., *thirteen black boards*) in sentences (e.g., *Thirteen blackboards/black boards were purchased at the lumberyard this morning*). Acoustic analysis of S1 of the target word *thirteen* revealed decreased duration of this syllable in stress clash contexts. Results also showed that the fundamental frequency of S1 decreased when target words were produced in positions other than word-initial in

sentences. The fundamental frequency of S1 was 196 Hz in initial position, 176 Hz in sentence-medial position, and 164 Hz in sentence-final position with no significant difference between S1 in stress clash contexts and S1 in non-clash contexts. There was, however, a significant difference between contexts.

This investigation did not provide any evidence for stress clash resolution, but did provide support for pitch accent assignment. The results of experiments three and four showed that the listener perceived primary stress to fall on S1 of the target word in both stress clash and non-clash contexts. This is consistent with the prediction of the early assignment of fundamental frequency to syllables in phrases. No acoustic evidence that might underlie stress shift was found in this investigation, although higher fundamental frequency of S1 of target words was found in the fourth experiment with no difference between stress clash and non-clash contexts.

Stress clash may have been averted by placing the experimental word *Chris* between syllables that had the potential for primary stress assignment. Fundamental frequency has been found to be reduced when a target syllable occurs between two primary stressed syllables. In the phrase Dundee tartan /dʷʌndi tɑrtən/, S2 of the word *Dundee* was found to be susceptible to fundamental frequency reduction because of its position between two strong syllables in this phrase (Gussenhoven, 1991; Horne, 1990). In the experimental sentence *TOM introDUCED Chris BURN to his SISter* (Cooper & Eady, 1986), either the word *Tom* or S3 in the word *introduced* may have been assigned pitch accent because these syllables contain full vowels. In addition, the word *Burn* or S1 in the word *sister* may have been assigned the final pitch accent. As a result of the assignment of

pitch accent to this word, the target word *Chris* would have been perceived as bearing reduced stress because of its position between two stressed syllables.

The report of early prominence fluctuated as the experimental word was placed in different contexts. For example, when a strong syllable preceded the experimental word *Japanese* (e.g., *Jack's Japanese canoes won the race*), the report of early prominence on *Jap-* occurred less frequently than when the experimental word was preceded by a weak syllable (e.g., *The Japanese colleagues came on Monday*). These results provide additional evidence for the hypothesis that the preceding context plays a major role in the resolution and the avoidance of stress clash. The acoustic investigation of stress clash has also shown that a strong syllable preceding the target words results in reduction of fundamental frequency, duration and intensity in the target word (Vogel, Bunnell, & Hoskins, 1995).

In summary, the Cooper and Eady (1986) study was based on the erroneous assumption that stress patterns can be determined solely by acoustic analysis (Dainora & Hemphill, 1997; Grabe & Warren, 1995). Grabe and Warren (1995) found no acoustic differences between shift and non-shift contexts, although stress shift was perceived by trained listeners. In fact, perceptual judgments, which are the only basis for the assignment of stress placement, were not carried out in many of the experiments reported here. Dainora and Hemphill (1997) also used only acoustic analysis to study stress clash resolution and found non-significant differences in acoustic factors between words in stress clash contexts and the citation form of these words. These investigators concluded that "...acoustic factors have very little to do with the perception of stress and stress changes that motivated the formulation of the Rhythm Rule" (p. 17). Cooper and Eady

(1976) employed perceptual analysis in only two out of the five experiments that investigated stress clash. Perceptual analysis, however, is essential in the judgment of stress. In addition, judgments of primary stress were made by a single listener. A second listener would have provided better control for bias or error.

Summary

The results of stress clash studies have varied. Some investigators argue that primary stress shifts to S1 of target words in stress clash contexts (Grabe & Warren, 1995). Other investigators argue that the acoustic features in the final syllable of a target word are reduced in stress clash contexts (Gussenhoven, 1991; Horne, 1990; Nespore & Vogel, 1989; Vogel, Bunnell, & Hoskins, 1995). Other studies, however, have shown no significant change in the acoustic features of final syllables of target words (Dainora & Hemphill, 1997). Other investigators argue that there are no acoustic changes in S1 of the target words (Cooper & Eady, 1986). Finally, some investigators argue that pitch accent, in the form of fundamental frequency, is assigned to the first syllable in a phrase that contains a full vowel. In this case, the assignment of pitch accent to S1 of the target word will result in the judgment of stress shift to this syllable (Shattuck-Hufnagel, 1995).

Investigations have also shown that the judgment of stress patterns in words is influenced by context. Vogel, Bunnell, and Hoskins (1995) found that the judgment of stress shift decreased when target words were preceded by a primary stressed syllable. Grabe and Warren (1995) found that stress shift judgments were reduced when the target word was presented as excised from the sentence context. The intonational patterns of a

phrase or a sentence may play a role in the judgment of stress shift. These intonational patterns may point to an accented syllable by either upward or downward movement to that accented target (Bolinger, 1955; 1958). Without the full intonational context, a listener is provided with cues to a stress pattern that differs from the one perceived in the unaltered utterance.

Although studies have focused on the syllables in stress change, the vowels that are able to accept stress have not been identified. In fact, vowel quality may be subject to greater variation in production because of dialect. Vogel, Bunnell, and Hoskins (1995) used only four target words to examine stress clash effects. Their results showed a significant, but very small, difference between listeners' judgments of main stress in the final syllable of target words in clash versus non-clash contexts. This may have resulted from positioning target words so that S1 becomes a candidate for pitch accent assignment (e.g., *The raccoon coat was lost*). In this example, pitch accent may be assigned to S1 in the word *raccoon* because it is the first full vowel in the phrase. This results in the shift of primary stress from S2 to S1 in the word *raccoon*. This pattern may be perceived to occur in both stress clash and non-clash contexts. Their results may also have been based on the patterns associated with the production of this small set of words. For example, speakers use stress to make contrasts more explicit or because word meaning must be preserved. In one case, the word *Chinese* is understood when stress falls on either S1 or on S2. However, a speaker may use special care to maintain the stress pattern of number words to prevent them from being confused with one another, e.g., *thirty* and *thirteen*. A larger set of words would minimize the problems caused by a limited set of target words.

Finally, no investigation confirmed the fact that experimental words were produced in a similar manner by all participants. A valid study of stress clash requires a determination of whether participants produce the target words in the same manner: (a) the position of main stress in the citation form of target words (b) the identity of the vowel in the first syllable in target words. Subsequently, some words may not participate in stress clash resolution. Shattuck-Hufnagel, Ostendorf, and Ross (1994) used a dictionary to select words for their stress clash study. This method assumes that the spoken word corresponds to the written word in terms of participants' variation in word production.

Statement of the Problem

The studies that have investigated stress clash have had certain limitations: (a) a limited set of vowels in S1 position, (b) a limited number and variety of experimental words, (c) a limited control of contextual effects that could have assisted or prevented the occurrence of stress changes in target stimuli, (d) an acoustic analysis of only one of the syllables in the limited number of target words and, (e) the absence of a perceptual investigation of the participants' production of experimental words to determine the segmental and prosodic characteristic of each word, both in citation form and in a variety of contexts. The current experiment was designed to address these issues and to answer the following research questions:

1. Is stress clash resolved (or avoided) when there is potential for it to occur?

2. Does stress shift, if it occurs, occur in both stress clash and non-clash contexts?
3. What are the differences between the acoustic features in clash versus non-clash stress contexts: which acoustic feature(s) change(s) in stress clash contexts when stress clash is resolved?
4. Does pitch accent play a role in the perception of stress shift?
5. Does the position of the target word in phrases play a role in stress clash resolution?
6. Which S1 vowels will accept stress in the resolution of stress clash?
7. Does the frequency of occurrence of the target word play a role in stress clash resolution/avoidance?

Chapter 3

METHOD**Participants**

Ten monolingual American-English speaking adults (five females; five males) participated. They were recruited by letters sent to local organizations in the New York Metropolitan region (e.g., a local religious group, college, and a reproductive rights organization). All participants had resided in this region for at least twenty years and their speech patterns were judged to be typical of the standard dialect of this region by the examiner. All participants reported normal hearing, typical speech and language abilities, and an unremarkable medical history.

The participants' ages ranged from 35 to 50 years (\bar{x} = 42 years). No participant had been trained in the fields of linguistics or phonetics. Seven participants had earned a B.A., one had earned an M.A. , and two had earned law degrees. Participants were employed as a writer (1), a social worker (1), a school teacher (1), a dance therapist (1), a college administrator (1), a publisher (1), an advertisement writer (1), an insurance underwriter (1), and a lawyer (2).

Experimental Stimuli: Experimental Words

Initially, a set of 700 words was gathered for this study (Appendix A). This set consisted of S2-stressed words, S1-stressed words, and monosyllables (the latter two sets to be used as foils). These words were gathered from a list of 40,000 English words (Blockcolsky, Frazer, & Frazer, 1987). The goal was to obtain a set of S2-stressed words

that contained a wide variety of vowels in S1. A matching set of S1-stressed words was gathered with the goal of matching the vowels found in S1 of the S2-stressed words. Out of this set, four hundred and seven words were selected to provide an adequate number and variety of vowels in S1 for S1- and S2-stressed words. The participants' productions of the citation form of these words was recorded (see below for recording procedures). The goal was to select the S2-stressed words to be placed in experimental sentences according to the criteria discussed below. The 407-word subset consisted of: (a) 226 bisyllabic words with primary stress expected to be placed on S2 (e.g., racCOON) (b) 38 bisyllabic words with primary stress expected to be placed on either S1 (e.g., OBject) or on S2 (e.g., obJECT) (c) 124 bisyllabic words with primary stress expected to be placed on S1 (e.g., TUlip), and (d) 19 monosyllabic words (Appendices B - E). With the exception of S2-stressed words, the other words acted as foils.

The S1- and S2-stressed words contained one of the tense vowels (/i, e, o, u, ɔ/) or one of the lax vowels (/ɪ, a, ɛ, æ, ʊ, ə/) in S1. Each word was placed in a series of randomized word lists and appeared once on each list. The primary investigator and a second listener, both trained in phonetics, judged whether the S2-stressed words were produced in the same manner by all participants: (a) with primary stress on S2 and (b) with the same vowel in S1. Words meeting these criteria were then used to develop the experimental sentences.

Some S2-stressed words were removed from the corpus of experimental words because of several different pronunciations of the vowels in S1. For example, the word *erect* was removed because it was produced with the vowel /ə/ in S1 (i.e., [ə'rekt]) by one

participant and with the vowel /ɪ/ in S1 (i.e., [ɪrɛkt]) by another participant. Word foils and words with schwa were eliminated from the word list. The remaining 67 S2-stressed words, produced in the same manner by all participants, were put into experimental sentences. This set of words contained at least two examples of the target vowels mentioned above. Experimental words were also classified by frequency of occurrence using the MRC Psycholinguistic Database (1987). This database contains 150,837 words and provides a measure of written frequency (Kucera & Francis, 1967). Written Frequency is indicated in column 6 through 10 (Appendix F).

Experimental Paradigm and Sentence Stimuli

The S2-stressed words were placed in two positions (early-sentence and late-sentence) and in two contexts (stress clash and non-clash) in sentences. Words were placed in early-sentence position to attract pitch accent (posited to fall on the first full vowel in a phrase). Words were placed in late-sentence position to allow pitch accent to fall on an earlier syllable in the phrase. The words that were placed in a stress clash context were followed by a primary stressed syllable. The words that were placed in a non-clash context were followed by a syllable with secondary stress or by a weakly stressed syllable to preclude stress clash (i.e., an article, an auxiliary, or a preposition) (see Table 1).

Experimental words that were positioned to attract pitch accent were either the first word in the phrase or were preceded by a weak syllable such as *the*. When experimental words were positioned to allow pitch accent to fall on an earlier occurring word, the target words were preceded by a primary-stressed syllable, such as the proper nouns *Jean*

Table 1

Experimental Sentence Types: Position and Context

-
- a. Early-sentence position; stress clash context

The raccoon coat was lost in June.

- b. Early-sentence position; non-clash context

The raccoon is an animal.

- c. Late-sentence position; stress clash context

Jean bought a raccoon coat in June.

- d. Late-sentence position; non-clash context

d. Jean bought a raccoon in the mall.

Note. Sentences were constructed for the potential for assignment of pitch accent to S1 of the target word *raccoon* in sentences (a) and (b) and to the word *Jean* in sentences (c) and (d). Sentences were also constructed to create the potential for stress clash between S2 of the target word *raccoon* and the following word in sentences (a) and (c). All sentences were constructed to contain eight syllables.

or *Dave*. The proper nouns were followed by at least one other word.

The analysis of the target words that were produced in experimental sentences revealed that seven participants produced eight of the S2-stressed target words with the schwa in S1 rather than the expected vowel (e.g., *erect*, *precede*, *refrain*, *remand*, *raccoon*, *pastel*, *adept*, and *profane*). These sentences were eliminated. Finally, fifty-nine S2-stressed words that had been identified as being produced in a similar manner by all participants. These words were retained for analysis (Appendix G).

Recording Procedures

The same procedures were followed for recording the production of the experimental words in citation form and the production of the experimental sentences. Participants were recorded in one hour sessions in a quiet environment, using an ATR25 microphone and a Sony digital audio tape recorder (TCD-D8). Participants were seated at a desk with the microphone placed approximately 12 inches away from their faces and positioned to the side of their mouths. Participants were told that the experimental study involved the analysis of consonant production. Participants were given instructions (a) to read the number of each word (or sentence) and (b) to read at a comfortable rate: not too fast nor too slow. The rate instruction was delivered orally and the reading instruction was presented at the top of each page of the lists of the experimental words. All word and sentence lists were presented in a random order.

Data Analysis

The goal of perceptual analysis was to determine if stress shift would occur when S2-stressed words were placed in stress clash contexts. The instances of stress shift were identified by perceptual analysis. In addition, utterances were analyzed perceptually to determine if the effect of pitch accent could be distinguished from that of stress shift in stress clash contexts. The same two listeners, described above, recorded their judgments of the position of primary stress, the identities of the vowels in S1, and the position of pitch accent in the experimental S2-stressed words. The primary investigator also determined that S2 vowels did not vary from the vowel that was produced in the citation form of target words.

In the perceptual analysis of experimental stimuli, the two trained listeners were given only two choices regarding the location of main stress in the target words in sentences: (a) primary stress on the first syllable or (b) primary stress on the second syllable. Listeners also determined if the syllable following the S2 of the experimental words was stressed and so provided a trigger for stress clash.

Acoustic measures were obtained for S1 and S2 of the words in which a stress shift was perceived to occur. In addition, measures were obtained for the same words when there was no perceptible shift in stress. For example, the primary stress on the word *ornate* may have been judged to shift only in an early-sentence position and in a stress-clash context (*The ornate balcony was built*). Subsequently, the acoustic features of the word *ornate* were measured when it was produced by this participant in other positions and contexts (e.g., late-sentence position in a stress clash context; late-sentence position in a non-clash context; early-sentence position in a non-clash context). Using this method, it

was possible to identify the acoustic features that presumably cued the perception of main stress on S1 (stress shift judgments) or on S2 (non-shift judgments).

Words were segmented into syllables to measure the durations of S1 and S2.

Following segmentation, the peak F_0 and the peak intensity were determined for S1 and S2 of the target word. The following segmentation criteria were used for S1 analysis. The onset of syllables beginning with stop consonants was measured from the burst, syllables beginning with fricatives from the onset of frication, and syllables beginning with vowels or resonant consonants from the onset of formant structure.

The offset of S1 was measured from the onset of release or the onset of acoustic features of the following syllable for stops, from the offset of frication for fricatives, and the offset of formant structure or an abrupt change in formant structure for vowels or resonant consonants. The onset of S2 was measured from the onset of closure for stops, from the onset of frication for fricatives, and the onset of formant structure for syllables beginning with vowels or with resonant consonants.

The offset of S2 was measured from the release (if present) for syllables ending with stops or (if release absent) from the onset of the acoustic features of the following word in the sentence, from the offset of frication for syllables ending with fricatives, and from the offset of formant structure of an abrupt changes in formant structure for syllables ending in vowels or in resonant consonants. The same procedures were used to segment the offset of the final syllable of target words from the onset of the following word in experimental sentences. Both acoustic information and auditory identification were used to the judgments of segmentation.

Reliability

A pilot study was implemented to train the two listeners (i.e., the primary investigator and a speech scientist) in the identification of primary stress position and the position of pitch accent. Listeners' judgments of stress position and the identification of vowels in S1 of the target words were compared for agreement following independent analysis. Agreement reached 96%. In the current experiment, the item in question was eliminated when disagreement occurred for stress position or for vowel identity.

Statistical Analyses

A repeated measures Multiple Analysis of Variance (MANOVA) was conducted to examine the perceptual judgments of the position of primary stress and of the position of pitch accent in the S2-stressed experimental words and to evaluate the effect of the acoustic features underlying the perceptual judgments. The independent variables were position (early vs. late), context (stress clash vs. non-clash), and gender (male vs. female participants). The latter variable was included to determine if gender played a role in stress clash resolution. The dependent variables were stress shift (SH), pitch accent (PA), and the combination of stress shift and pitch accent (PASH) that were judged to fall on S1 of the S2-stressed experimental words. In the acoustic analysis of data, the independent variables were gender (female vs. male), context (stress clash vs. non-clash), position (early-sentence vs. late-sentence), syllable (S1 vs. S2), stress shift (yes vs. no), and pitch accent on S1 or S2 (yes vs. no). Dependent variables were fundamental frequency, duration and intensity.

Perceptual Analysis and Scoring

Perceptual analysis consisted of listeners' judgments of instances of (a) stress shift of primary stress from S2 to S1 and (b) the assignment of pitch accent to S1 of the S2-stressed words that were judged to shift when produced in experimental sentences. Each instance of stress shift was categorized in terms of the context in which it occurred (stress clash or non-clash context), the position of the word in the sentence in which stress shift occurred (early-sentence or late-sentence position), and the gender of the participant that produced the target word (male or female).

The total number of instances of stress shift that occurred in each context and in each sentence position was determined and scored (Appendix H). As shown in Appendix G, participant 1 was judged to produce 14 instances of stress shift in a stress clash context (SC) when the target word was in early-sentence position (1). In 13 of these instances, pitch accent was judged to fall on S1. Therefore, the number "1" was entered into the shift (SH) column and the number "13" was entered into the pitch accent (PA) column. The shift column thus marked the instances of stress shift independent of pitch accent on S1, whereas the pitch accent column marked the instances of stress shift that were judged to have pitch accent fall on S1. The total number of instances of stress shift was entered in the column marked PA + SH (i.e., the combination of scores in the shift column and in the pitch accent column). In this column, participant 1 received a score of 14: one instance of stress shift without pitch accent judged to fall on S1 and 13 instances of stress shift with pitch accent judged to fall on S1 of the words that were judged to shift.

Acoustic Analysis and Scoring

Each word in which stress was judged to shift was examined by making measurements of fundamental frequency, intensity, and duration. Although the stress in a particular word may have been judged to shift in one context and/or in one position when produced by a particular participant, it may have been judged not to shift in another context or position. In spite of this difference, the word was acoustically analyzed in all contexts and in all positions when produced by the participant. For example, the stress in the word *thirteen* may have been judged to shift in the stress clash context in early-sentence position when produced by one of the participants.

Stress, however, may have been judged not to shift in the three other productions by this speaker/participant: (a) the non-clash context in early-sentence position, (b) the stress clash context in late-sentence position, and (c) the non-clash context in late-sentence position. However, this word was acoustically analyzed in all the other contexts and positions. In this way, it was possible to compare the acoustic features in shift vs. non-shift instances and to analyze and to compare the acoustic factors that led to the judgment of shift (Appendix I).

Multiple Analyses of Variance (MANOVAs) were conducted to identify the contributions to stress assignment of the acoustic features of fundamental frequency (F0), duration (ms), and amplitude (dB). These acoustic features were measured in S1 and in S2 of the target words that were produced in experimental sentences. The primary investigator measured the durations of S1 and S2, the peak of fundamental frequency in S1 and in S2, and the peak of intensity in S1 and in S2. The Multi-Speech, Model 3700 software program (Kay Elemetrics) was used to measure the acoustic features.

Chapter 4

Results

Perceptual Analysis

The 59 S2-stressed experimental words that were produced in the 500 experimental sentences by 10 participants were selected for analysis. These words had been produced in two contexts in sentences (stress clash and non-clash) ($N = 1180$) and in two positions in sentences (early-sentence position and late-sentence position) ($N = 1180$). The potential for stress shift was assumed for the words that had been placed in stress clash contexts ($N = 1180$) in both early-sentence position ($N = 590$) and in late-sentence position ($N = 590$). This potential was assumed to be absent for the words that were placed in non-clash contexts ($N = 1180$) in early-sentence position ($N = 590$) and in late-sentence position ($N = 590$). The potential for pitch accent assignment was assumed to exist for S1 of the words that were placed in early-sentence position in both stress clash and non-clash contexts ($N = 1180$).

There were 456 instances of stress shift that occurred in sentences: 264 with pitch accent on S1 and 192 without pitch accent on S1 (see Figure 3). The first analysis examined all instances of stress shift, with and without pitch accent on S1. The second analysis examined stress shift only in the words that were judged not to have pitch accent on S1. The third analysis examined stress shift only in the words that had pitch accent on S1. Multiple Analyses of Variance (MANOVAs) were conducted to test the effects of gender (female vs. male), context (stress clash vs. non-clash) and position (early- vs. late-

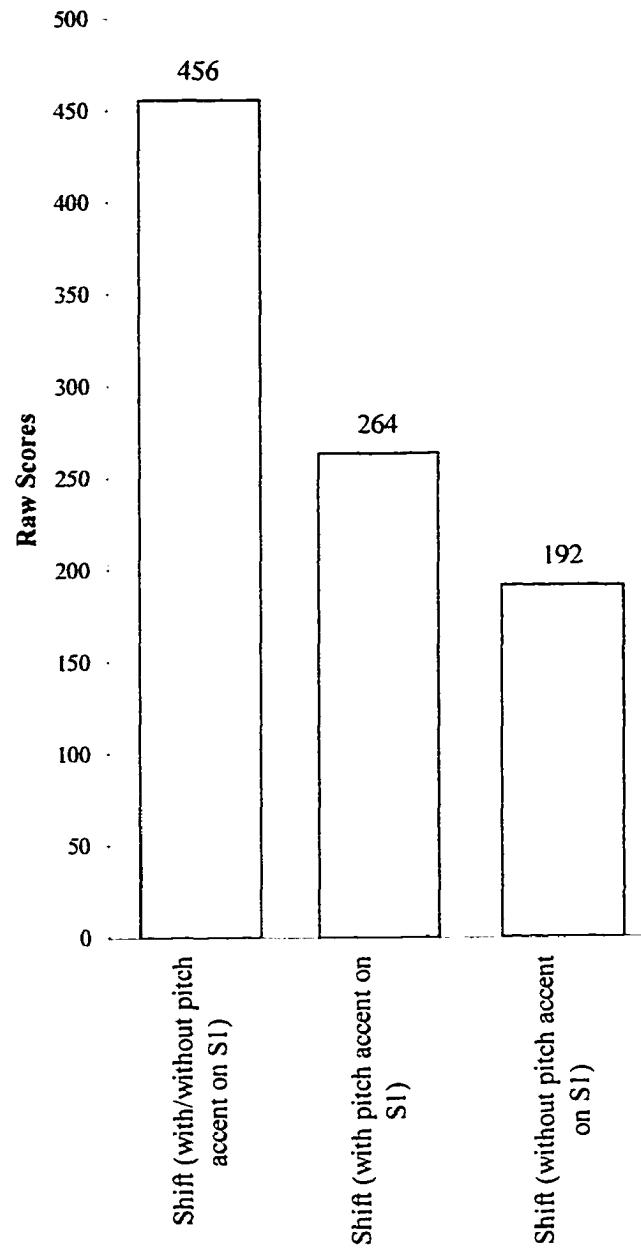


Figure 3. A comparison of the number of instances of stress shift with and without pitch accent on the first syllable of the target word that was produced in the experimental sentences. Raw scores are presented.

sentence). The dependent variables were shift (the instances of stress shift without pitch accent on S1), shift plus pitch accent (the total number of instances of stress shift with and without pitch accent on S1) and pitch accent (the instances of stress shift with pitch accent on S1).

The first statistical analysis examined the 456 words in which stress was judged to shift, with and without pitch accent on S1 (see Table 2). Results showed a significant effect for context with the average number of shifts per subject judged to occur more frequently in stress clash contexts ($M = 15.85$, $SD = 5.75$) than in non-clash contexts ($M = 6.95$, $SD = 4.47$), $F(1,8) = 132.57$, $p < .0001$ (see Figure 4). There were no significant effects for gender ($F(1,8) = 3.66$, $p > .05$) or for position ($F(1,8) = 2.41$, $p > .05$). There were no significant interactions.

The second analysis examined the 192 instances of stress shift that were judged to occur without pitch accent on S1 (see Table 3). Analysis revealed a significant main effect for context with a greater number of instances of stress shift judged to occur in stress clash contexts ($M = 7.85$, $SD = 3.36$) than in non-clash contexts ($M = 1.75$, $SD = 1.25$), $F(1,8) = 46.30$, $p < .0001$ (see Figure 5). There were no main effects for gender (male vs. female), $F(1,8) = 1.04$, $p > .05$, or for position (early- vs. late-sentence position), $F(1,8) = 1.18$, $p > .05$. There were no significant interactions.

The third analysis included only the 264 instances of stress shift with pitch accent judged to fall on S1 (see Table 4). There was a significant main effect for context that showed that stress in syllables in stress clash contexts shifted more frequently ($M = 8.00$, $SD = 4.89$) than syllables in non-clash contexts ($M = 5.20$, $SD = 2.91$), $F(1,8) = 24.40$, $p < .001$ (see Figure 6).

Table 2

Analysis of Variance in the Perceptual Results for 10 Participants: Stress Shift (N = 456)

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Square	Error Term	F	p
G (gender)	211.60	1	57.75	8	3.66	.092
P (position)	57.60	1	25.93	8	2.41	.159
C (context)	792.10	1	5.98	8	32.57	.001*
G x P	.00	1	23.93	8	.00	1.000
G x C	.10	1	5.98	8	.02	.900
P x C	2.50	1	4.00	8	.63	.452
G x P x C	2.50	1	4.00	8	.63	.452

Note. This analysis was based on all instances of stress shift, independent of pitch accent to fall or to not fall on S1.

* $p < .001$

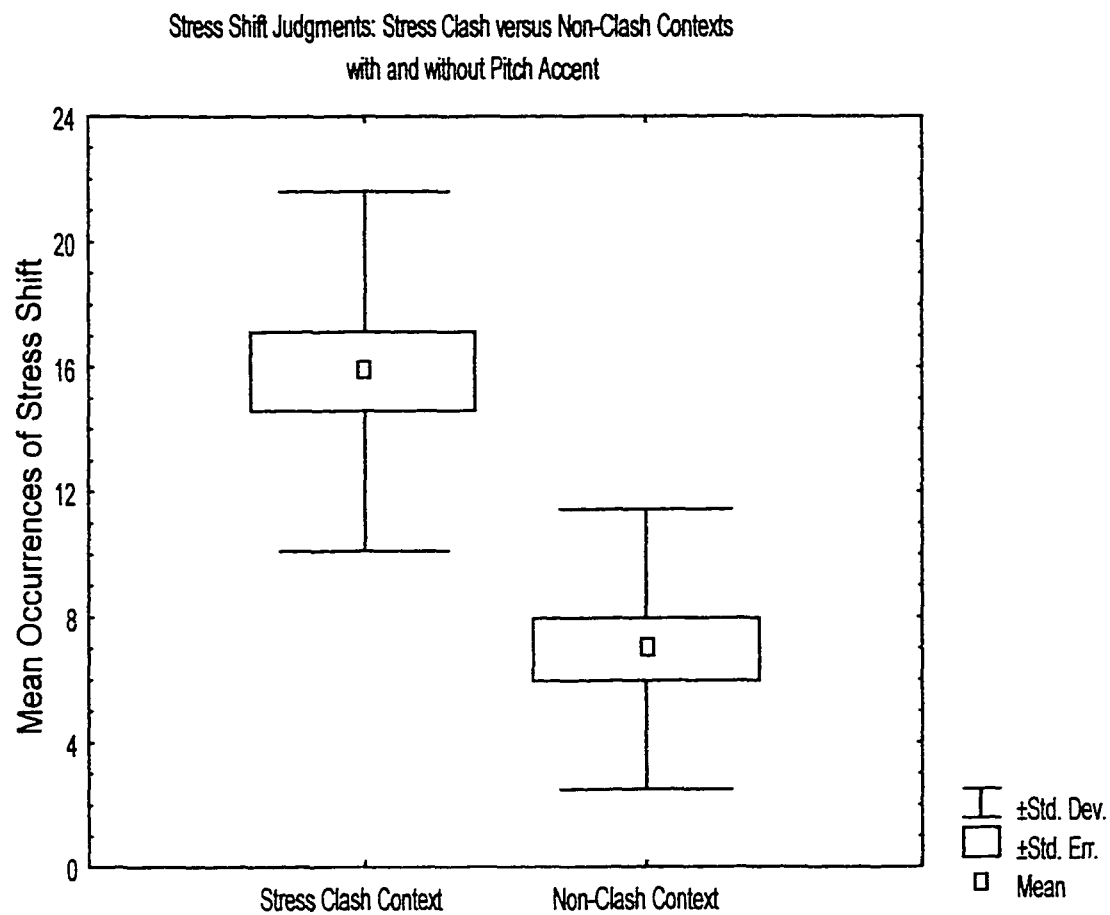


Figure 4. Mean scores represent the judgments of all primary stress shifts from S2 to S1 in S2-stressed target words produced in sentences by 10 participants. These scores represent the stress shift judgments independent of pitch accent.

Table 3

Analysis of Variance in the Perceptual Results for 10 Participants: Stress Shift (N = 192)

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Square	Error Term	F	p
G (gender)	8.10	1	7.79	8	1.04	.338
P (position)	3.60	1	3.06	8	1.18	.310
C (context)	372.10	1	8.04	8	46.30	.001*
G X P	16.90	1	3.06	8	5.52	.047
G X C	25.60	1	8.04	8	3.19	.112
P X C	4.90	1	3.81	8	1.29	.290
G X P X C	3.60	1	3.81	8	.94	.360

Note. This analysis was based on the number of instances of stress shift in words that were judged to not have pitch accent fall on S1.

* $p < .001$

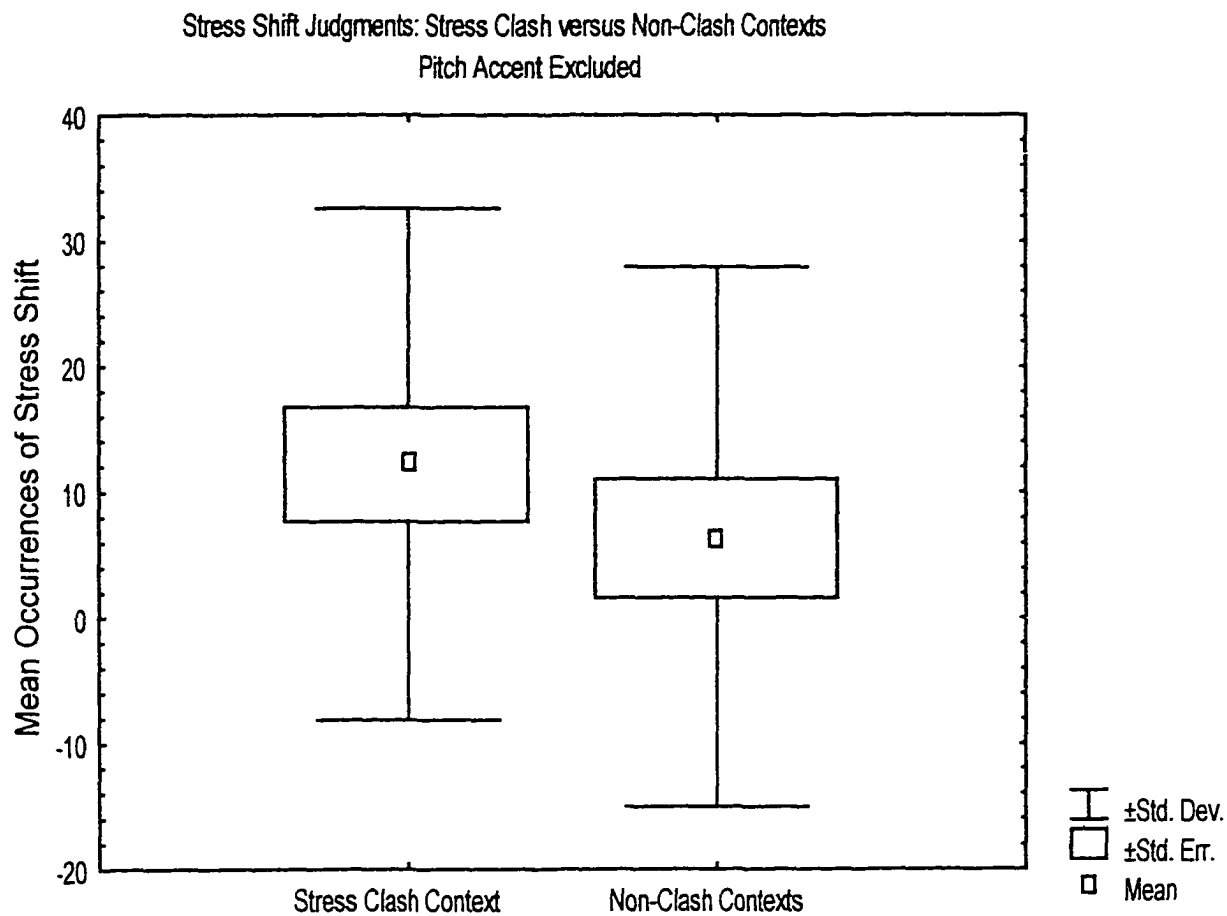


Figure 5. Mean scores represent the judgment that primary stress shifted from S2 to S1 in S2-stressed target words produced in sentences by 10 participants. These scores represent the judgment that stress shifted with the absence of pitch accent on S1 of the words in which stress was judged to shift.

Table 4

Analysis of Variance in the Perceptual Results for 10 Participants: Stress Shift (N = 264)

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Square	Error Term	F	p
G (gender)	302.50	1	7.79	8	8.28	.021
P (position)	90.00	1	3.06	8	5.95	.041
C (context)	78.40	1	8.04	8	24.40	.001*
G x P	16.90	1	3.06	8	1.11	.322
S x C	28.90	1	8.04	8	9.00	.017
P x C	14.40	1	3.81	8	6.58	.033
G x P x C	.10	1	3.81	8	.05	.836

Note. This analysis was based on the number of instances of stress shift in words that were judged to have pitch accent fall on S1.

* $p < .001$

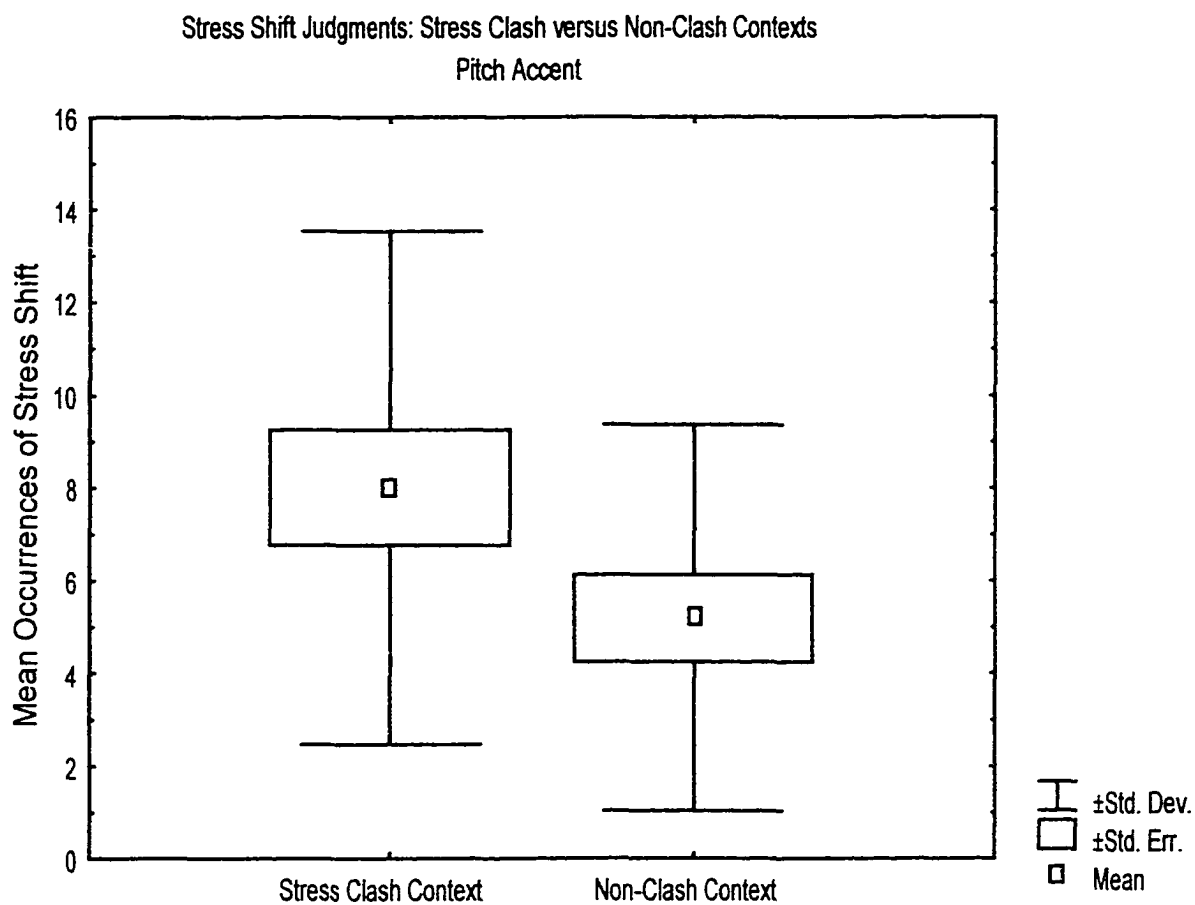


Figure 6. Mean scores represent the judgment that primary stress shifted from S2 to S1 in S2-stressed target words produced in sentences by 10 participants. These scores represent the judgment that pitch accent fell on S1 of the words in which stress was judged to shift.

Results were analyzed to determine if pitch accent fell on the initial syllable in the target words produced in early-sentence position (i.e., not preceded by a primary stressed syllable). Analysis showed that pitch accent fell on the target words in early-sentence position 219 times (23%) and on target words in late-sentence position 119 times (12%). Analysis showed that the main effect for position approached, but did not reach, significance (as defined in the current study): stress on S2-stressed words in early-sentence position shifted more frequently to S1 ($M = 8.10$, $SD = 4.96$) than stress on S2-stressed words placed in late-sentence position ($M = 5.10$, $SD = 2.93$), $F(1,8) = 5.95$, $p < .04$

In summary, stress shift was judged to occur in stress clash contexts more frequently than in non-clash contexts, whether pitch accent was included or excluded. However, the inclusion of pitch accent increased the judgment of stress shift. The trend toward judgments of stress shift to S1 for words in the early-sentence position suggests that stress clash studies must take position into account.

Word Production

There was significant variation in the amount of shift among words with scores ranging from 0-20 (see Table 5). Primary stress in the words *thirteen* and *fourteen* was judged to shift with the greatest frequency (20 instances). Stress in the word *Chinese* was judged to shift with the next greatest frequency (18 instances). Vowel analysis revealed that stress shift was judged to occur most frequently when S1 contained the schwa (/ə/) and the rhotic diphthong /ɔə/ (see Table 6). However, no significant correlation was found between stress shift and vowel quality ($r_s = .16$, $t = 1.06$, $p > .05$) for tense versus lax vowels.

Table 5

Words in Which Stress was Judged to Shift: Classified by Vowel in S1 of the Target Words

Shift Frequency: >10	Shift Frequency: >10
/aə/ parquet (11)	cartoon (2), chartreuse (4), harpoon (4)
/æ/ antique (13), cascade (10), flambeau (11)	bamboo (8), ballet (7), tableau (6), campaign (4), cafe (4), taboo (3)
/a/	blockade (8), pontoon (5), stockade (8)
/ɪ/ impure (18)	imbed, immune, impaired, impose, impressed, improved (all 0); infirm (9), inept (5), intense (1)
/u/ U.2. (17) and U.N. (12)	duet (2), crusade (1), unite (0), lunette (0), roulette (0)
/ə/ thirteen (20)	
/ɜ/ - /ɝə/ fourteen (20)	ornate (7), Pauline's (7), ordeal (4), Georgette's (3) Georgine's (1), Maurice (1)
/o/ robust (10)	hotel (7), Jose (7), rotund (7), Roseanne (5), cocaine (3), overt (3), domain (0), rosette (0)
/aɪ/ Chinese (18)	
/i/	preempt (2), react (0), rebuild (5)
/e/	Bayonne (2)
/ɛ/	technique (2) festoon (3)

Note. The total number of times primary stress in target words was judged to shift in stress clash contexts is presented in parentheses following each word. The number for potential stress shift was 20 for each word in early- and late-sentence position as produced by 10 participants.

Table 6

Vowel Shift Frequency: S1 Vowel in Target Words

Vowel	Percentage of Stress Shift	Vowel Characteristic
/aɪ/	.73	Tense (Diphthong)
/ə/	.60	Tense (Schwar)
/ɔɪ/	.26	Tense (Rhotic Diphthong)
/a/	.24	Tense
/æ/	.21	Lax
/aɪ/	.18	Tense (Rhotic Diphthong)
/u/	.17	Tense
/o/	.16	Tense
/ɪ/	.13	Lax
/ɛ/	.13	Lax
/ɔ/	.10	Tense
/i/	.08	Tense
/e/	.03	Tense
/ə/	.00	Lax

Note. The mean frequency of occurrence of stress shift is presented in percentages for the vowels in S1 of the target words produced in sentences. This percentage was calculated by dividing the number of times that stress shifted in each word by the potential for stress shift, in both stress clash and in non-clash contexts (20 times). These results show that the syllable that contained the diphthong /aɪ/ and the schwar /ə/ shifted most frequently than other vowels. However, there was no significant difference between vowels.

Perceptual analysis had shown that the vowels in S1 of the citation forms were variable. For example, five participants had produced the word *raccoon* with either the vowel [æ] or the schwa [ə] in S1. Thus, this word was excluded from final analysis because the vowel in S1 of this word was produced differently by different speakers. In addition, the words *thirteen* and *Chinese* have frequently been used to determine whether stress clash resolution does or does not occur. The use of these words would ensure that stress shift would occur.

The primary stress in the word *obese* did not shift in any context or in any position, because the vowel in S1 cannot be footed (Gussenhoven, 1991) (see Figure 7). However, three instances of stress shift were judged to occur in the production of the word *overt*, which appears to possess the same structure as *obese*. This result appears to contradict the hypothesis that foot structure is an essential component in stress shift. However, the word *overt* may represent a lexical exception. Only a small number of words that corresponded to the structure of the word *obese* were used in the current study. Therefore, further investigation of the role of foot structure in stress shift may be warranted.

Word Frequency

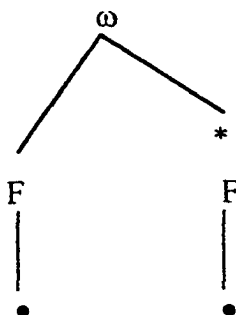
An examination of the proportion of stress shift in relation to the frequency of occurrence of target words (Kucera & Francis, 1967) was examined. The Spearman rank order correlation coefficient was calculated to test the correlation between frequency of occurrence and stress shift. Results showed no significant correlation between the frequency of occurrence and the frequency that stress shifted in a particular word ($r_s = .13$, $t = -68$, $p > .05$).

a. Footed Syllables

Word Level

Accent (*)

Foot Level

*canteen*

can

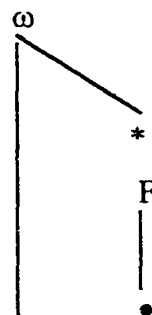
teen

b. Unfooted and Footed Syllables

Word Level

Accent (*)

Foot Level

*obese*

o

bis

Figure 7. The relative nature of stress is shown in Foot Formation. Stress is represented in constituent structure that consists of a strong element (*) and a weak element (unmarked). The S1 in the word *canteen* may receive stress in a stress clash context because secondary stress falls on this syllable. In contrast, S1 in the word *obese* does not receive stress because open syllables are not footed (Gussenhoven, 1991).

Acoustic Analysis

A repeated measures Multiple Analysis of Variance (MANOVA) was conducted to analyze the acoustic features of the S2-stressed target words. Planned comparisons ($p < .001$) were used to test differences among mean scores. The independent variables were stress shift (yes vs. no), position (early-sentence vs. late-sentence position), context (stress clash vs. non-clash contexts), pitch accent judged to fall on the S1 of the target words (yes vs. no), gender (female vs. male), and word ($n = 59$). Dependent measures were fundamental frequency, duration, and intensity.

Fundamental Frequency

There was a main effect shown for stress shift: when stress shift was judged to occur, fundamental frequency was higher in both syllables (S1-S2) of the target words ($M = 169$ Hz, $SD = 42$) than when stress shift was judged to not occur ($M = 159$ Hz, $SD = 38$), $F(1,8) = 47.15$, $p < .0001$ (see Table 7). There was, however, an interaction between the effects of syllable and shift ($F(1,8) = 126.01$, $p < .00001$). Planned comparisons ($p < .001$) revealed a 17 Hz difference between S1 when stress shift occurred in comparison with S1 when stress shift did not occur ($M = 170$ Hz, $SD = 42$ vs. $M = 153$ Hz, $SD = 36$). In contrast, there was no significant difference between S2 when stress shift occurred and S2 when stress shift was judged to not occur ($M = 167$ Hz, $SD = 43$ vs. $M = 165$ Hz, $SD = 39$). These results revealed that the acoustical factors that potentially affect stress shift were present more frequently in S1 than in S2.

Table 7

Analysis of Variance in the Acoustic Results for 10 Participants: Fundamental Frequency

Source of Variance	Mean Square Effect	Degree of Freedom Effect	Mean Square Error	Degree of Freedom Error	F	p
G (gender)	154753.6	1	8809.28	8	17.57	.003
C (context)	-.0	1	59.22	8	0.00	1.000
P (position)	13875.6	1	365.33	8	37.98	.001*
SY (syllable)	819.0	1	37.47	8	21.86	.002
SH (shift)	3783.0	1	80.23	8	47.15	.001*
G X C	30.6	1	59.22	8	.52	.493
G X P	2371.6	1	365.33	8	6.49	.034
C X P	115.6	1	58.51	8	1.98	.198
G X SY	25.6	1	37.47	8	.68	.432
C X SY	2.5	1	1524.36	8	.06	.814
P X SY	403.2	1	41.71	8	9.67	.020
G X SH	250.0	1	80.23	8	3.12	.116
C X SH	422.5	1	26.27	8	16.08	.004
P X SH	172.2	1	42.66	8	4.04	.079
SY X SH	2325.6	1	18.46	8	126.01	.001*
G X C X P	46.2	1	58.51	8	.79	.400
G X C X SY	9.0	1	42.17	8	.21	.655
G X P X SY	2.5	1	41.71	8	.06	.813
C X P X SY	3.6	1	12.97	8	.28	.613
G X C X SH	18.2	1	26.27	8	.69	.429
G X P X SH	280.9	1	42.66	8	6.58	.033
C X P X SH	102.4	1	26.16	8	3.92	.083
G X SY X SH	36.1	1	18.46	8	1.96	.200
C X SY X SH	.9	1	18.48	8	.05	.831
P X SY X SH	50.6	1	9.67	8	5.24	.051
G X C X P X SY	21.0	1	12.97	8	1.62	.239
G X C X P X SH	7.2	1	26.16	8	.28	.613
G X C X SY X SH	.6	1	18.48	8	.04	.859
G X P X SY X SH	16.9	1	9.67	8	1.75	.223
C X P X SY X SH	4.9	1	6.43	8	.76	.408
G X C X P X SY X SH	11.0	1	6.43	8	1.71	.227

* $p < .001$

Fundamental frequency in both syllables of the target word was significantly higher in early-sentence position ($\underline{M} = 173$ Hz, $\underline{SD} = 44$) than in late-sentence position ($\underline{M} = 155$ Hz, $\underline{SD} = 34$), $\underline{F} (1,8), = 37.98, p < .0003$. In contrast, there was no significant difference in late-sentence position between S1 ($\underline{M} = 154$ Hz, $\underline{SD} = 34$) and S2 ($\underline{M} = 155$ Hz, $\underline{SD} = 34$). There was a main effect for gender with fundamental frequency higher for female participants ($\underline{M} = 195$ Hz, $\underline{SD} = 24$) than for male participants ($\underline{M} = 133$ Hz, $\underline{SD} = 26$), $\underline{F} (1,8), = 17.57, p < .003$. There was no interaction involving gender.

Duration

Statistical analysis revealed that S2 ($\underline{M} = 249$ ms, $\underline{SD} = 33$) was significantly greater in duration than S1 in both contexts (e.g., stress clash and non-clash) and in both positions (early- and late-sentence position) ($\underline{M} = 179$ ms, $\underline{SD} = 25$), $\underline{F} (1,8), = 92.0, p < .0001$. When stress shift was judged to occur, however, S1 increased in duration ($\underline{M} = 181$ ms, $\underline{SD} = 30$) and S2 decreased in duration ($\underline{M} = 240$ ms, $\underline{SD} = 25$), but these changes were not significant (Table 8). There were no other main effects and no interactions.

Intensity

Statistical analysis revealed that intensity in both syllables was greater in early-sentence position ($\underline{M} = 70.85$ dB, $\underline{SD} = 3.31$) than in late-sentence position ($\underline{M} = 69.55$ dB, $\underline{SD} = 3.55$), $\underline{F} (1,8), = 27.04, p < .0008$ (see Table 9). Analysis also revealed an interaction between syllable and shift ($\underline{F} (1,8), = 130.22, p < .00001$). Planned

Table 8

Analysis of Variance in the Acoustic Results for 10 Participants: Duration

Source of Variance	Mean Square Effect	Degree of Freedom Effect	Mean Square Error	Degree of Freedom Error	F	p
G (gender)	3686.4	1	4816.28	8	.77	.407
C (context)	1742.4	1	606.09	8	2.87	.128
P (position)	664.2	1	601.26	8	1.10	.324
SY (syllable)	195580.2	1	2126.80	8	91.96	.001*
SH (shift)	1500.6	1	1010.20	8	1.49	.257
G X C	783.2	1	606.09	8	1.29	.289
G X P	260.1	1	601.26	8	.43	.529
C X P	78.4	1	163.53	8	.48	.508
G X SY	202.5	1	2126.80	8	.10	.766
C X SY	705.6	1	228.44	8	3.09	.117
P X SY	13.2	1	281.72	8	.05	.834
G X SH	940.9	1	1010.20	8	.93	.363
C X SH	.1	1	669.01	8	.00	.991
P X SH	119.0	1	447.74	8	.27	.620
SY X SH	4182.0	1	1338.81	8	3.12	.115
G X C X P	245.0	1	163.53	8	1.50	.256
G X C X SY	931.2	1	228.44	8	4.08	.078
G X P X SY	136.9	1	281.72	8	.49	.506
C X P X SY	260.1	1	125.79	8	2.07	.188
G X C X SH	189.2	1	669.01	8	.28	.609
G X P X SH	144.4	1	447.74	8	.32	.586
C X P X SH	722.5	1	584.80	8	1.24	.299
G X SY X SH	435.6	1	1338.81	8	.33	.584
C X SY X SH	260.1	1	443.57	8	.59	.466
P X SY X SH	70.2	1	740.52	8	.10	.766
G X C X P X SY	34.2	1	125.79	8	.27	.616
G X C X P X SH	342.2	1	484.80	8	.59	.466
G X C X SY X SH	7.2	1	443.57	8	.02	.902
G X P X SY X SH	490.0	1	740.52	8	.66	.440
C X P X SY X SH	67.6	1	377.05	8	.18	.683
G X C X P X SY X SH	225.6	1	377.05	8	.60	.461

* $p < .001$

Table 9

Analysis of Variance in the Acoustic Results for 10 Participants: Intensity

Source of Variance	Mean Square Effect	Degree of Freedom Effect	Mean Square Error	Degree of Freedom Error	F	p
G (gender)	30.63	1	81.17	8	.38	.556
C (context)	.63	1	2.36	8	.26	.621
P (position)	67.60	1	2.50	8	27.04	.001*
SY (syllable)	15.63	1	2.17	8	7.21	.028
SH (shift)	93.03	1	99.59	8	.93	.362
G X C	1.60	1	2.36	8	.68	.434
G X P	.03	1	2.50	8	.01	.923
C X P	7.23	1	1.34	8	5.38	.049
G X SY	4.90	1	2.17	8	2.26	.171
C X SY	1.60	1	.55	8	2.91	.127
P X SY	2.03	1	.56	8	3.60	.094
G X SH	25.60	1	99.59	8	.28	.626
C X SH	.40	1	2.63	8	.15	.707
P X SH	11.03	1	.78	8	14.23	.006
SY X SH	52.90	1	.41	8	130.22	.001*
G X C X P	.90	1	1.34	8	.67	.437
G X C X SY	.63	1	.55	8	1.14	.318
G X P X SY	1.60	1	.56	8	2.84	.130
C X P X SY	-.00	1	.29	8	0.00	1.000
G X C X SH	1.23	1	2.63	8	.47	.514
G X P X SH	4.90	1	.78	8	6.32	.036
C X P X SH	6.40	1	3.06	8	2.09	.186
G X SY X SH	.23	1	.41	8	.55	.478
C X SY X SH	.03	1	.58	8	.04	.840
P X SY X SH	.10	1	.38	8	.27	.620
G X C X P X SY	.03	1	.29	8	.09	.778
G X C X P X SH	2.03	1	3.06	8	.66	.439
G X C X SY X SH	.00	1	.58	8	.00	1.000
G X P X SY X SH	.03	1	.38	8	.07	.803
C X P X SY X SH	3.03	1	.84	8	3.59	.095
G X C X P X SY X SH	.10	1	.84	8	.12	.740

*p < .001

comparisons revealed a greater difference between S1 and S2 when stress shifted (2 dB) than the difference between S1 and S2 when stress did not shift (1 dB).

In summary, fundamental frequency (see Figure 8) and intensity (see Figure 9) followed a similar pattern. There was a greater difference between the intensity of S1 and S2 when stress shifted than when stress did not shift. There was a greater difference between the fundamental frequency of S1 than S2 when stress shifted than when stress did not shift. The results of the analysis of fundamental frequency, duration and intensity are presented in Appendix J.

Participant Analysis

The gender effect for fundamental frequency was examined by obtaining a ratio between S2 and S1 of the target words that were produced in sentences by all participants. The mean score for fundamental frequency for S1 for each word produced in each context and in each position by each participant was divided by the mean score for S2. Scores were calculated for each participant. A Multiple Analysis of Variance (MANOVA) was conducted with the dependent measures of gender (male vs. female), context (stress clash vs. non-clash) and position (early- vs. late-sentence position). The analysis showed the main effects for position and for shift, but no main effect for gender. There were no interactions. This suggests that the results obtained for gender, with female participants' fundamental frequency higher than fundamental frequency for male participants, may have resulted more from female participants' general ability to produce higher fundamental frequency than from any other factor.

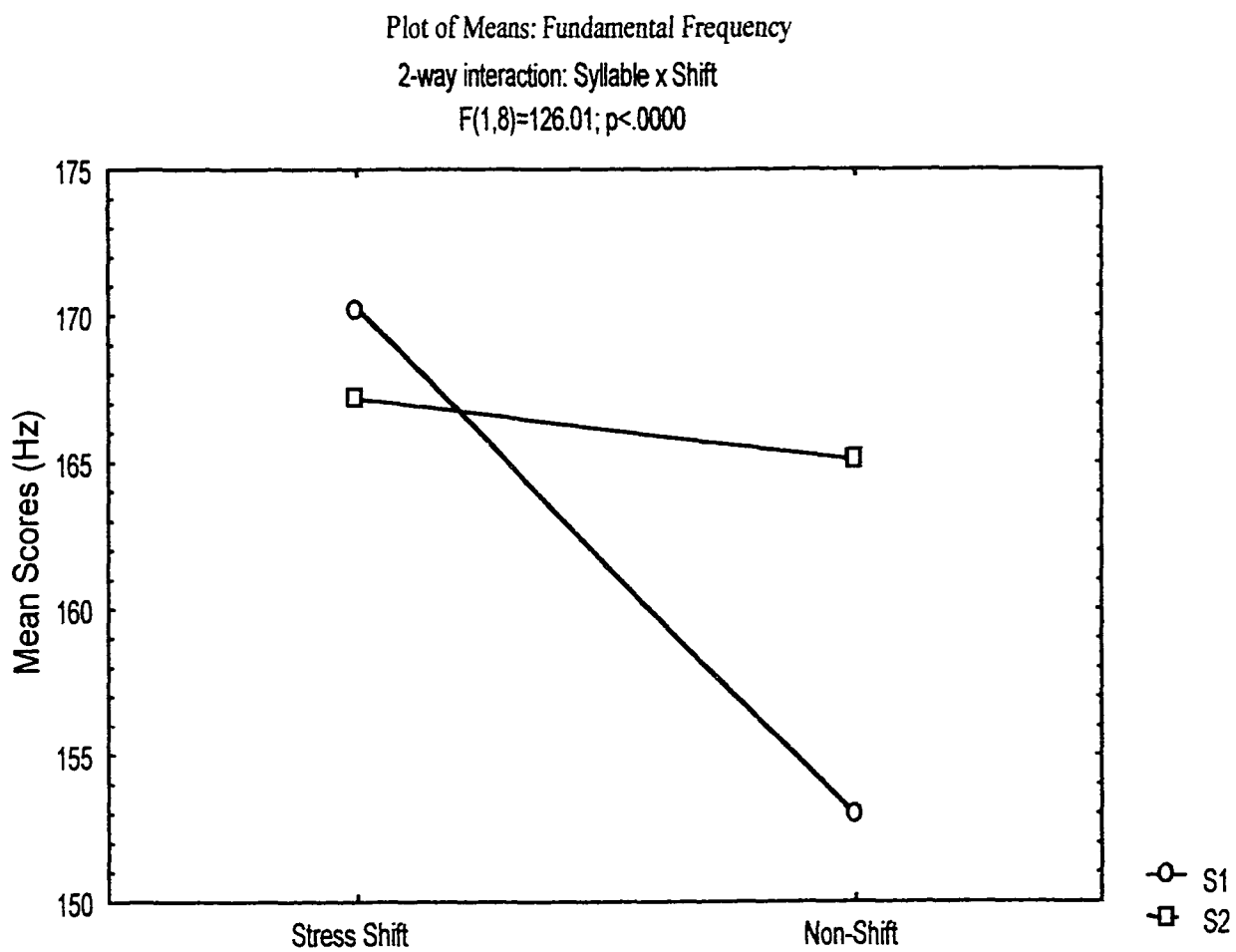


Figure 8. Mean scores for fundamental frequency in S1 and in S2 of target words are presented. There was a greater difference for fundamental frequency in S1 when stress shift occurred versus the difference in S2.

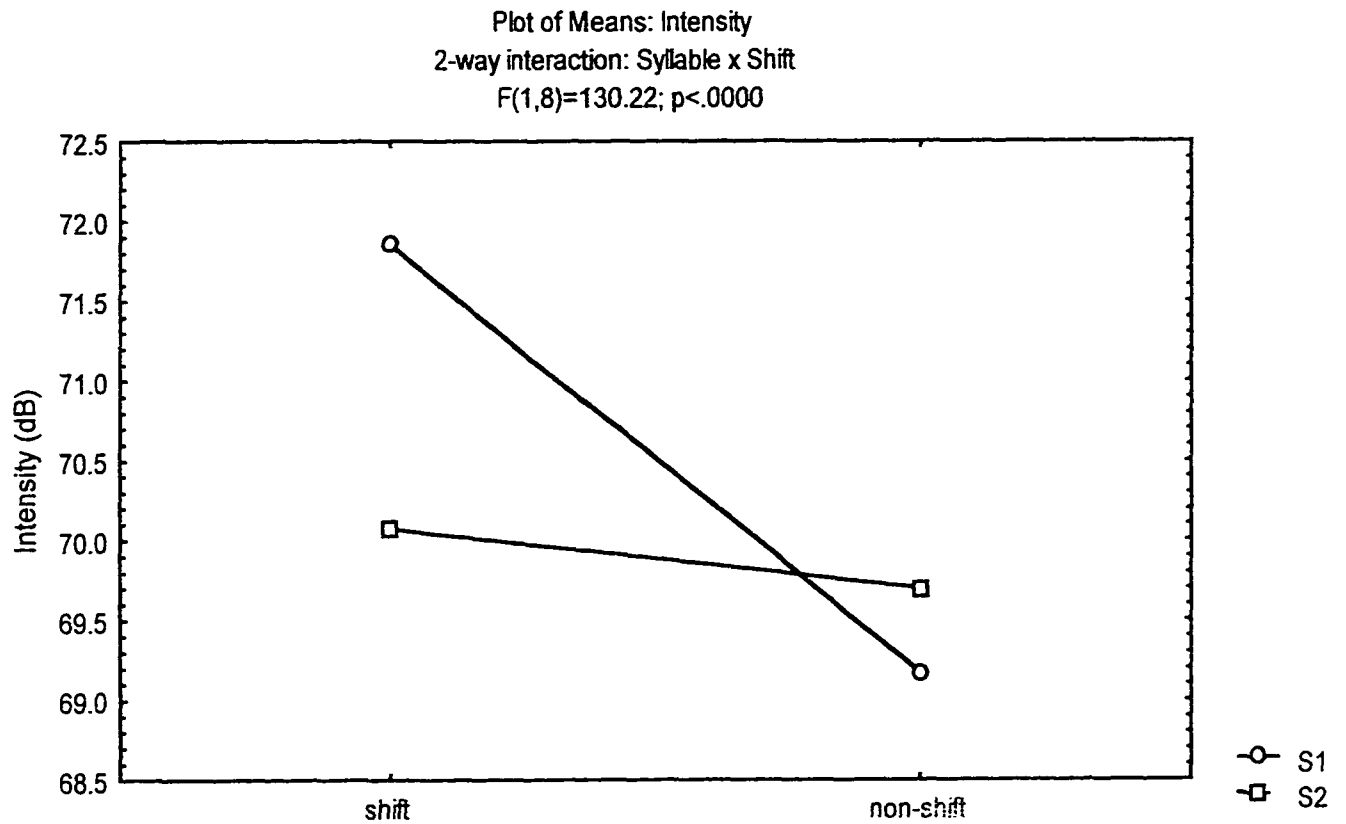


Figure 9. Mean scores for intensity in S1 and in S2 of target words are presented. There was a greater difference between intensities of S1 and S2 when stress shifted than when stress did not shift.

Pitch Accent

Pitch accent is hypothesized to consist of higher fundamental frequency that falls on the first full vowel in a phrase. Given this hypothesis, data were analyzed for the presence of higher fundamental frequency on S1 of target words in early-sentence position. Analysis showed that S1 fundamental frequency was higher when stress shifted ($\underline{M} = 170$ Hz, $\underline{SD} = 42$) than when stress did not shift ($\underline{M} = 153$ Hz, $\underline{SD} = 36$). The analysis of S2 showed no significant difference between S2 when stress shifted ($\underline{M} = 167$ Hz, $\underline{SD} = 43$) than when stress did not shift ($\underline{M} = 165$ Hz, $\underline{SD} = 39$). In addition, fundamental frequency was higher in both syllables of the target word in early-sentence position (173 Hz) than in late-sentence position (155 Hz) but there was no difference between S1 and S2 in late-sentence position. The inclusion of pitch accent on S1 increased stress shift scores for the words produced in early-sentence position. Although the fundamental frequency of both syllables of the target word was higher in early-sentence position, stress was perceived to shift to S1.

Multiple Regression

A multiple regression was performed to determine if the perception of stress shift could be predicted by the differences between S1 and S2 for fundamental frequency, for duration, and for intensity. The data were those found in the acoustic analysis of target words with the addition of shift as a dependent variable. The differences between the means for fundamental frequency (F0), for duration, and for intensity of S1 and S2 for each word in which stress was judged to shift were calculated and used in the regression

analysis (Appendix H). The regression equation ($\text{shift} = 6.59 + .23 * \text{F0 difference} - .000021 * \text{duration difference} + .65 * \text{intensity difference}$) had an adjusted R^2 of .42 ($F(3,41) = 11.73, p < .00001$ (see Table 10). The coefficient for fundamental frequency difference was positive and was statistically significant but the coefficients for duration and intensity difference were not (see Figure 10). These results show that the larger the differences in fundamental frequency and in intensity between S1 and S2 in the target word, the more likely is the perception of stress shift. These results account for a significant proportion of the stress shift judgment score. The remaining variance must be attributed to random variation or to other factors not taken into consideration in this analysis.

Summary of Results

Perceptual analysis revealed that stress shift occurred in both stress clash and in non-clash contexts, but the judgment of stress shift was greater in stress clash contexts. Results also revealed that when pitch accent fell on the target word, stress shift perception was more likely to occur. In contrast, the exclusion of pitch accent reduced the instances of the perception of stress shift. Word production analysis showed the variable production of the vowel in S1 of target words, including the production of the schwa in S1 (e.g., [rə:kun]). These words were excluded from the final analysis to maintain vowel consistency. These results suggest that analysis of the production of experimental words is a necessary component of stress clash studies. Although there were no significant

Table 10

Summary of Regression Analysis for Variables Predicting Stress Shift (n = 45)

Variable	<u>B</u>	<u>SE B</u>	β	<u>p</u>
Intercept	6.59	1.03		.000
Fundamental frequency difference	.23	.04	.66 *	.001
Duration difference	- .00	.01	-.00	.998
Intensity difference	.65	.35	.22	.068

Note. $R^2 = .46$, Adjusted $R^2 = .4$ ($p < .00002$).

* $p < .001$.

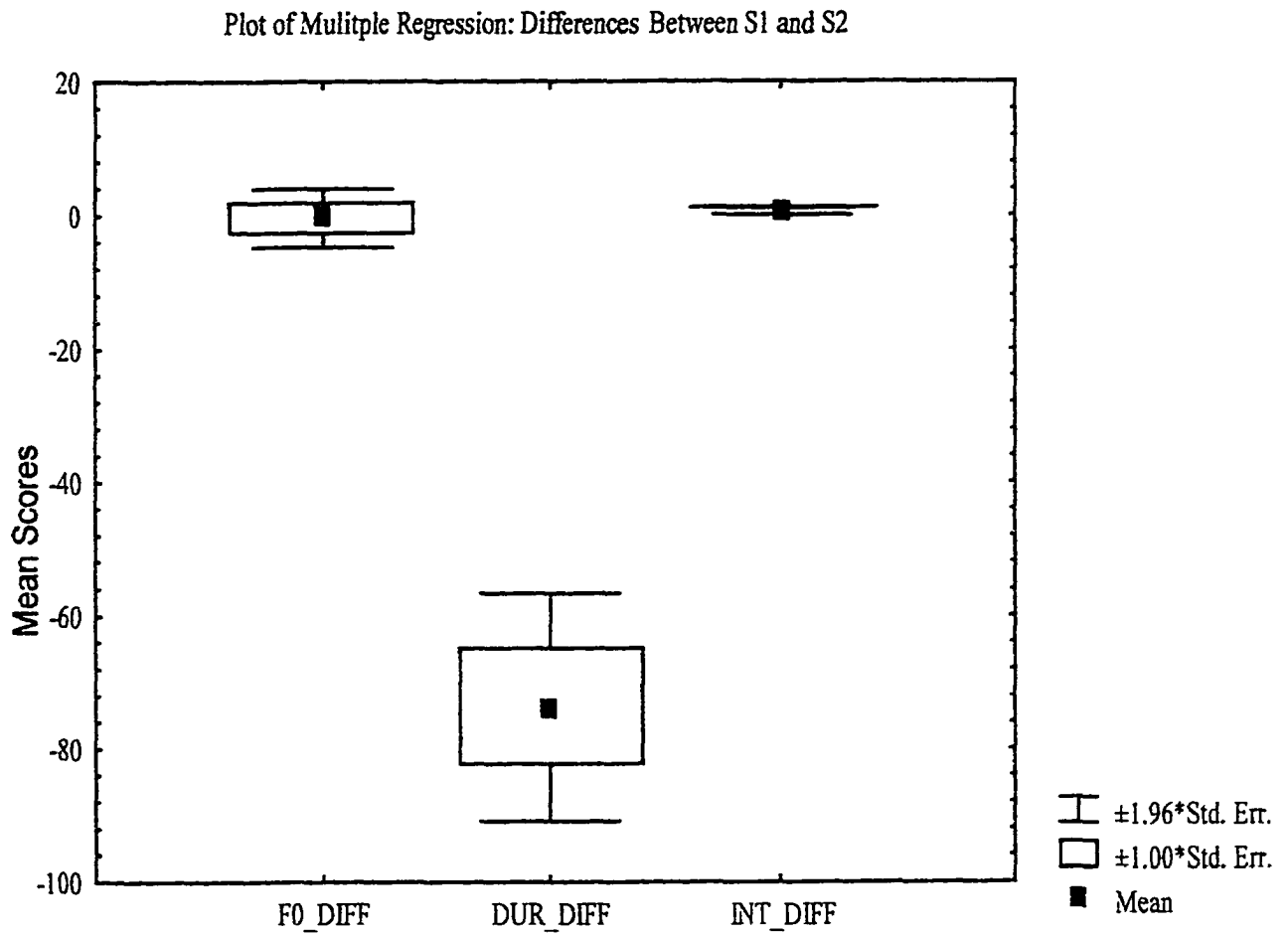


Figure 10. The mean differences between S1 and S2 are shown for fundamental frequency (F0), intensity (ms) and duration (Hz).

differences found in vowel analysis, words that contained the diphthongs and the schwa were judged to shift more frequently (in both stress clash and in non-clash contexts). The word *obese* was judged to not shift when produced by all participants, suggesting that foot structure may play a role in stress shift. The statistical analysis showed that fundamental frequency increased for S1 when stress shifted but that the difference between S1 and S2 was not significant. When stress shifted, the difference in intensity between S1 and S2 was greater than the intensity between S1 and S2 when stress did not shift. Contrary to some predictions, the duration of the final syllable of the target word did not increase to resolve stress clash. Instead, duration decreased significantly when stress shift occurred. A regression analysis showed that fundamental frequency was a potentially significant cue to stress shift but that intensity and duration were not.

Acoustic analysis revealed that the main effect of stress shift was associated with changes in S1. There was a 17 Hz difference between the mean fundamental frequency of S1 when stress shifted (170 Hz) versus the mean fundamental frequency of S1 when stress did not shift (153 Hz). In contrast, there was only a 2 Hz difference between the mean fundamental frequency of S2 when stress shifted (167 Hz) versus the fundamental frequency of S2 when stress did not shift (165 Hz). The results of acoustic analysis also revealed that the fundamental frequency of both S1 and S2 of the target words was reduced when the target word was produced in late-sentence position in comparison to the production of the word in early-sentence position. These results show that the effect of a preceding primary stress acted to reduce the values of the acoustic features for both syllables in the target word.

Chapter 5

Discussion

The present study was designed to answer the seven research questions raised in chapter 2:

1. Is stress clash resolved (or avoided) when there is potential for it to occur?
2. Does stress shift, if it occurs, occur in both stress clash and non-clash contexts?
3. What are the differences between the acoustic features in clash versus non-clash stress contexts: which acoustic feature(s) change(s) in stress clash contexts when stress clash is resolved?
4. Does pitch accent play a role in the perception of stress shift?
5. Does the position of the target word in phrases play a role in stress clash resolution?
6. Which S1 vowels will accept stress in the resolution of stress clash?

7. Does the frequency of occurrence of the target word play a role in stress clash resolution/avoidance?

This chapter will discuss the results of the experiment in relation to the answers to these questions and will also evaluate the various accounts of stress clash resolution that were presented in chapters 1 and 2.

Research Questions

Relative to the first question, stress clash resolution occurred 27% of the time.

These results suggest that stress clash resolution is inconsistent and may depend on factors other than stress clash. As we shall see later on, this percentage is inflated by the inclusion of the effects of pitch accent.

The second question addressed the occurrence of stress shift in both stress clash and non-clash contexts. Results showed that stress shift occurred in both contexts: 27% of the time in stress clash contexts and 12% of the time in non-clash contexts. A significantly higher percentage of stress shift occurred in stress clash contexts than in non-clash contexts, thus these results indicate that stress shift did not result from stress clash alone. Again, percentages of stress shift in both contexts were enhanced by the effect of pitch accent.

The third question addressed the acoustic features in clash versus non-clash contexts to determine which features changed when stress shifted. The perception of stress

shift appears to have been based on rather small differences in fundamental frequency between S1 and S2 (with S2 having the higher fundamental frequency). Results showed that there was only a 3 Hz difference in fundamental frequency between S1 and S2, on the average, when stress shifted. There was a 12 Hz difference when stress did not shift. The smaller difference, which was not statistically significant, between the fundamental frequencies of S1 and S2, appears to have been adequate to elicit judgments of stress shift. The interaction between syllable and shift showed that there was a significant difference between the fundamental frequency of S1 when stress shifted and the fundamental frequency of S1 when stress did not shift, but that there was no significant difference between S2 when stress shifted and S2 when stress did not shift. Therefore, the major correlates of stress shift can be found in S1. These results strongly suggest that changes in S2 do not play a major role in the resolution of stress clash.

The role of duration in stress clash resolution was found to be non-significant: S2 was significantly greater in duration than S1 in both stress clash and non-clash contexts (249 ms vs. 179 ms). This contradicts the hypothesis that final syllable duration increases to resolve stress clash. Analysis showed that the duration of S2 decreased when stress shift occurred (256 ms to 240 ms). However, this decrease still left the duration of S2 greater than the duration of S1. In addition, this decrease was not statistically significant. A multiple regression analysis performed on stress shift judgments against differences between S1 and S2 for fundamental frequency, intensity, and duration revealed a positive and significant relationship between stress shift and fundamental frequency. No positive relationship was found to exist between duration or intensity and the perception of stress

shift. These results suggest that duration is not an essential factor in the judgment of stress shift.

The acoustic analyses support some, but not all, of the findings of previous studies of stress clash. The current findings are consistent with those of Vogel, Bunnell, and Hoskins (1995) who found that fundamental frequency and intensity were lower in both syllables of the target word when it was preceded by a syllable with primary stress and that fundamental frequency and duration were lower in the final syllable of target words in stress clash contexts. The current findings, however, revealed a change in the acoustic features of the initial syllable which Vogel, Bunnell, and Hoskins (1995) did not find in any of the four target words used in their study.

The current results are consistent with those of Shattuck-Hufnagel, Ostendorf, and Ross (1994) who found an increase in fundamental frequency that correlated with an increase in the perception of primary stress on S1 of the target word. This study and theirs also found no correlation between the perception of stress shift and duration. The findings of the current study, however, contrasted with those of Horne (1990) who found that increased fundamental frequency, duration and intensity were all correlated with the judgment of primary stress on S1.

The fourth research question addressed the role of pitch accent in the perception of stress shift. Results showed that stress shift occurred 27% of the time when pitch accent was included. The exclusion of pitch accent, however, reduced the percentage of judgments of stress shift to 13%. The exclusion of pitch accent also reduced the percentage of judgments of stress shift in non-clash contexts (12 % to 3%). This result

suggests that pitch accent may be an important perceptual cue to the occurrence of stress shift in non-clash contexts, as has been found in previous studies (Cooper & Eady, 1986; Vogel, Bunnell, and Hoskins, 1995). Stress clash resolution occurred inconsistently, but pitch accent occurred in all sentences. The assignment of pitch accent to S1, however, did increase stress shift judgments although stress clash was maintained in the majority of experimental sentences.

The fifth research question addressed the effect of the position of the target words in phrases when stress clash was resolved. Position played a role only when pitch accent was included in the analysis rather than when pitch accent was excluded. In the latter case, the percentage of stress shift judgments approached significance ($p < .04$) for words produced in early-sentence position (23%) versus late-sentence position (12%).

The sixth research question asked if the quality of the vowel in S1 played a role in stress clash resolution. Results showed that the differences between tense and lax vowels did not play a significant role. Stress shifted, however, more frequently when S1 contained the rhotic diphthongs /ɔɪ/ and /aɪ/, the schwa /ə/, and the diphthong /aʊ/. Diphthongs differ from other vowels by having greater duration (Borden, Harris & Raphael, 1994). This factor may explain the more frequent shift that occurred for the limited set of diphthongs used in the current study. Bolinger (1958) posited that greater duration was necessary to execute the upward or downward turn in fundamental frequency required for the production of pitch accent. The most critical potential effect on results was the production of the vowel schwa in S1 of the target words, which would have resulted in the inability of S1 to acquire primary stress. In this case, stress shift would be precluded.

The seventh and last research question asked if word frequency played a role in stress clash resolution/avoidance. Results showed that word frequency did not play a role.

Accounts of Stress Clash Resolution

Some of the answers to the research questions shed light on the accounts of stress clash resolution. The first account suggests that (a) lexical primary stress shifts from the final syllable to an earlier syllable of the first word in stress clash contexts (Grabe & Warren, 1995; Liberman & Prince, 1977) or that (b) acoustic features are reduced on the final syllable of the first word in stress clash contexts, leading to the judgment of primary stress on S1 (Gussenhoven, 1991; Horne, 1990; Nespor & Vogel, 1989; Vogel, Bunnell, & Hoskins, 1995). Results of the present study showed that stress shifted inconsistently in stress clash contexts. Stress shift occurred only slightly more than 25% of the time (less if pitch accent effects are excluded). The values of the acoustic features were reduced in S2 of target words, but these changes were not statistically significant, whatever their perceptual effects.

The second account of resolution that was investigated is that the duration of the final syllable of the target word is increased when stress clash is resolved (Selkirk, 1984). Results showed that the duration of S2 did not increase. This result is not surprising given the fact that the literature has shown a strong positive correlation, indeed, a causative relationship between greater duration and perception of primary stress (Bolinger, 1955; 1958).

The third account that was investigated is that pitch accent, taking the form of higher fundamental frequency, falls on the first syllable in a phrase that contains a full vowel (Bolinger, 1955; 1958; Shattuck-Hufnagel, 1995). Consequently, the early-sentence position of a target word would make it a candidate for pitch accent assignment. In this case, S1 of S2-stressed words would be assigned pitch accent and stress clash would be resolved. Results of this study revealed that there was a statistically significant difference between the fundamental frequency of S1 when stress shifted versus the fundamental frequency of S1 when stress did not shift. The analogous difference between the fundamental frequencies of S2 was not statistically significant. The percentage of stress shift was enhanced by the inclusion of pitch accent. These results suggest that pitch accent played a significant role in the perception of the location of primary stress although not in the resolution of stress clash.

Conclusions and Suggestions for Further Research

The infrequent occurrence of stress shift in stress clash contexts suggests that stress clash is not the only factor that leads to stress shift. For example, stress shift may result from a speaker's decision to emphasize a certain word in a phrase, a process that occurs frequently in natural language. For example, if a speaker must distinguish between a non-Chinese expert in the Chinese language (*A ChiNESE expert*) versus a Chinese expert in a subject (*A CHInese expert*), primary stress would be related to the semantic domain. An explanation of stress clash resolution must take semantic or pragmatic factors

into account. In the current study, the semantic content of sentences may have increased (or have decreased) stress shift scores because the semantic domain was not carefully controlled.

The results of the current study also suggest that listeners must be trained to identify both stress shift and pitch accent in stress clash experiments. Pitch accent was shown to play a role in the judgment of stress shift: with pitch accent included, stress shift scores were enhanced. These results suggest that pitch accent judgments must be included in the study of stress clash resolution. Results also showed that there was a trend toward more frequent perception of stress shift for target words that were produced in early-sentence position.

The results for word production showed variability in the production of the vowel in S1 in both citation- and in sentence-form. For example, five participants produced the vowel schwa in S1 of the S2-stressed target word *raccoon*, where the vowel /æ/ might be expected. The irony is that the word *raccoon* is frequently used as the quintessential example of stress shift when followed by a primary stressed syllable. These results suggest that stress clash studies require that the vowels in S1 of the target words be identified as they are actually produced by speakers, and not on the experimenter's presumption.

In contrast to the results shown for the word *raccoon*, primary stress in the words *Chinese* and *thirteen* was judged to shift 20 and 18 times respectively. Both of these words are frequently used as examples and as experimental items in stress clash studies. The contrast with the results for the word *raccoon* suggests that it is necessary to use a large variety of words to create a more robust test of stress clash resolution.

Further research

The unresolved questions raised by this study, with regard to semantic factors, show that further research must control for this domain in order to analyze its effect on stress shift. The goal would be to analyze the effect of semantic factors in stress shift.

The implications for phonological theory point to the need to include sentence intonation in the analysis of stress shift. The results of this study show that there are a number of variables that can affect the perception of primary stress. Intonation is only one of these variables. Further research should investigate the role of intonation in the perception of stress shift, especially as it interacts with the other variables that affect stress shift.

The present study used a variety of vowels, but a greater number of diphthongs and rhotic diphthongs might have yielded a more robust study of vowel quality in stress shift. Further studies should, therefore, include a greater variety of vowels to determine more definitively if vowel quality does play a role in stress clash resolution.

This study also revealed the need for a large pool of subjects: participants varied in the extent to which they resolved stress clash. For example, one participant was judged to resolve stress clash both in stress clash contexts (49 times) and in non-clash contexts (31 times) with relative frequency. Another participant resolved stress clash more frequently in stress clash contexts (49 times) and less frequently in non-clash contexts (17 times).

brunette	rebuild	chenille	imply
crusade	precede	eclipse	impose
duet	preempt	efface	impress
humane	prepare	eject	improve
throughout	reed	elite	impure
toupee	seed	estate	inane
unique	bead	lessee	incite
unite	tweed	negate	include
usurp	deed	shellac	increase
Maureen	lead	discuss	indeed
morale	need	disdain	indent
Pauline	pea	disgrace	induce
almost	reed	disguise	inept
although	enchain	disjoin	infect
forbid	enclose	diskette	infer
foresee	enfold	dislike	infest
forgave	enforce	displace	infirm
forget	engulf	embark	inflate
forgive	enrich	enjoy	inform
forgot	enroll	enlarge	insane
forsake	entail	enroute	inscribe
fourteen	enthuse	ensure	insist
georgette	excess	entire	inspect
Georgine	exclude	estate	inspire
ordeal	excuse	esteem	install
quartet	expel	express	instate
yourself	expire	himself	instead
Bombay	explain	ignite	insure
cartoon	explode	ignore	intense
chartreuse	explore	imbed	invade
fondue	expose	imbibe	invest
harpoon	express	impair	invoke
monsoon	expunge	impale	involve
parley	extent	impart	mirage
parquet	extort	impeach	misjudge
pontoon	festoon	impede	misspell
blockade	technique	impel	mistake
react	themselves	impinge	precise

Note. The initial word list (N = 700).

Table Continues

Appendix A

Pilot Word List: (n = 700)

prefer	beware	deploy	giraffe
receive	bewitch	deport	guitar
recline	bicker	depose	immense
redeem	bizarre	depress	immerse
reduce	cement	descend	immune
refer	chiffon	descent	Irene
refine	create	describe	neglect
reform	debate	design	relax
refresh	debug	desire	release
regain	decay	despair	relief
regale	deceit	device	relieve
regard	deceive	device	remain
rehearse	decide	devise	remove
reject	declare	devoice	renew
rejoice	decode	devoid	repeal
rejoin	decrease	devote	repeat
relate	deface	devour	replace
sincere	defeat	diffuse	reply
syringe	defect	dilute	reset
withdraw	defend	direct	resign
withdrawn	defense	divide	restrain
withdrew	defer	divine	result
becalm	defile	eclair	rethink
became	define	effect	reveal
because	deflate	eject	review
become	deform	elapse	revoke
began	defy	elite	reward
beget	delay	ellipse	reword
begin	delete	elope	rework
beguile	delight	elude	Tibet
behave	deluxe	enough	within
behind	demand	equate	without
behold	demure	erase	absolve
belief	denounce	erect	absurd
believe	deny	erode	accept
below	depart	event	adjoin
beneath	depend	evict	adjourn
between	depict	evoke	adjust
bewail	deplane	finesse	

Table continues.

combine	convert	unjust	unsure
combust	convey	unkind	untie
compel	convince	unknown	until
compete	corral	unlash	untold
compile	correct	unlatch	untrue
complain	obscure	unlearn	unveil
complete	observe	unleash	unwed
complied	obtain	unless	unwell
comply	obtrude	unlike	unwise
compress	obtuse	unlink	unworn
comprise	subdue	unlit	upend
compute	sustain	unload	upgrade
conceal	unable	unlock	upgrowth
concede	unarm	unloose	upheld
conceit	unbend	unmake	upon
concern	unbind	unman	uproot
concise	unbolt	unmask	aback
condemn	unborn	unnail	abash
condense	uncap	unnerve	abate
condone	uncaught	unpack	ablaze
confer	unchain	unpaid	aboard
confess	unclad	unpile	abode
confide	unclear	unpin	abort
confide	unclog	unread	about
confirm	unclothe	unreal	above
confuse	uncoil	unreel	abuse
consent	uncork	unripe	abyss
conserve	uncurl	unroll	accord
consign	undo	unsafe	accost
consist	undress	unsaid	account
console	undue	unscrew	accuse
conspire	unfair	unseal	achieve
consult	unfelt	unseat	acquire
consume	unfit	unseen	across
contain	unfurl	unsew	acute
contend	unglue	unshod	adapt
control	unhand	unsnap	adduct
convene	unhook	unsold	Adele
converge	unhurt	unstrap	adept

Table continues.

adopt	announce	attain	commute
adore	anoint	attempt	compare
adrift	apace	attend	decide
adult	apart	attest	delete
afar	apiece	attract	enough
affair	appall	avail	fatigue
affirm	appear	avenge	galore
afloat	applause	avert	garage
afraid	apply	avoid	gazelle
again	appraise	await	gazette
against	approach	awake	lagoon
agape	arise	award	machine
aghast	arose	awash	Marie
agree	around	away	marine
ahead	arouse	awhile	massage
akin	arrange	awoke	occult
alarm	array	balloon	offend
alas	arrest	bazaar	oppose
alight	ascend	beside	parade
align	ascent	Brazil	parole
alike	ashamed	buffoon	police
alive	ashore	caboose	polite
allot	ashore	cadet	pollute
allow	aside	café	promote
allure	asleep	canal	pronounce
aloft	aspire	canoe	propose
alone	assault	careen	ravine
along	assert	career	salute
aloud	assess	caress	secure
amaze	assign	cassette	sedan
amend	assume	charade	serene
amidst	assure	chenille	suppose
amiss	astound	collect	today
among	astray	collide	tonight
amount	astride	cologne	adhere
amuck	atone	command	adjoin
amuse	atop	commence	admire
Annette	attach	commend	advance

Table Continues

advice	pay	implant
advise	ray	indoors
antique	say	insert
bamboo	way	insult
campaign	bouquet	intern
cannot	brocade	object
canteen	homemade	preview
cascade	Joanne	project
cashier	Jose	rebel
farewell	obey	refuse
pastel	oblique	reject
shampoo	omit	transfer
transpose	opaque	Chinese
baboon	overt	thirteen
ballet	profane	obese
café	profess	
cassette	profound	
chapeau	abject	
dragoon	abstract	
macaw	accent	
papoose	addict	
platoon	address	
raccoon	adept	
rattan	adult	
taboo	allies	
tattoo	alloy	
trapeze	ally	
valet	almost	
Bayonne	ascent	
layette	aspect	
legume	attaché	
bay	attest	
day	augment	
gay	convict	
hay	erect	
jay	escort	
lay	Eugene	
may	excuse	

Appendix B
 Pilot Word List: Second Syllable Stress

First syllable vowel					
/i/	Detroit erect eclair evade precede	preempt react rebuild rebuilt rebuke	rebut recant reclaim refrain refuse	reject relay remand	
/a/	arcane blockade bombard Bombay	fondue monsoon parlay pontoon	stockade		
/ɑr/	cartoon chartreuse harpoon parquet				
/e/	Bayonne Ceylon layette	legume maintain			
/æ, advanced	advice advise advised antique	baboon ballet bamboo café canteen	campaign cascade flambeau flambeaued papoose	pastel platoon raccoon rattan shampoo	taboo tattoo trapeze
/aɪ/	Chinese				

Note. These target words were produced in citation form. A subset was selected to be placed in sentences for later production.

Table continues.

Appendix B
Pilot Word List: Second Syllable Stress

First syllable vowel					
/ɪ/	chiffon	imbibe	implant	induce	sincere
	demure	immense	imply	inept	sixteen
	diffuse	impaired	impose	infect	intent
	diskette	impale	impress	infer	
	disguise	impart	impressed	infest	
	divine	impeach	improved	infirm	
	giraffe	immune	impure	insane	
	guitar	impede	inane	insert	
	imbark	impel	indeed	insult	
	imbed	impinge	indent	intense	
/ɛ/	chenille	exact	negate		
	demure	extort	technique		
	effete	exclude	themselves		
	esprit	festoon			
	estate	lessee			
/ə/	thirteen				

Table continues.

Appendix B
 Pilot Word List: Second Syllable Stress

First syllable vowel						
/ə/	above	applause	buffoon	gazelle	parade	unreal
	abuse	around	caboose	lagoon	parole	unripe
	addict	arrest	cadet	macaw	serene	unsafe
	address	ashamed	canoe	machine	unclear	unsold
	adept	assume	career	marine	unfair	untied
	affair	attest	cassette	maroon	unfit	unwind
	alarm	award	cologne	obscure	unjust	unworn
	alive	balloon	commute	obtuse	unkind	
	alone	Brazil	convict	occult	unknown	

Table continues.

Appendix B
Pilot Word List: Second Syllable Stress

First syllable vowel

/ɔ/	augment	Koran	ornate	
	Dorcen	Maureen's	Pauline's	
	fourteen	Maurice	quartet	
	Georgette's	morale		
	Georgine's	ordeai		
/u/	brunette	roulette	U-2	
	crusade	routine	unique	
	duet	soufflé	unite	
	humane	Sudan	usurp	
	Hunan	toupee		
	Kuwait	U.N.		
	lunette	U.S.		
/o/	bowtie	obey	ptomaine	rotund
	brocade	oblique	profane	Spokane
	cocaine	okay	Rodin	Tokay
	domain	omit	romaine	
	homemade	opaque	Roseanne	
	hotel	overt	rosé	
	Joanne	proclaim	rosette	
	Jose	procure		

Table continues.

Appendix C
Pilot Word List: First or Second Syllable Stress

abject	alloy	compress	insert	refuse
abstract	ally	convict	insult	reject
accent	almost	erect	intent	relay
addict	ascent	escort	intern	robust
address	aspect	Eugene	object	segment
adept	attaché	excuse	preview	serrate
adult	attest	implant	project	transfer
allies	augment	indoors	rebel	

Note. These words acted as foils in the citation form word list. A subset was chosen to act as foils in the experimental sentences.

Appendix D
Pilot Word List: First Syllable Stress

<u>First syllable vowel</u>			
/u/	cooler	toolbox	
	duty	tulip	
	lunar	tuna	
	moonshine	tutor	
	ruler	Zulu	
/ɔ/	awesome	coffee	sawmill
	awful	lawful	walkup
	bother	lawsuit	Walter's
/ɑ/	bombshell	dollar	robber
	bother	father	Tommy's
	carpool	father's	waffle
	collar	poppy	Walter's
/i/	feeble	people's	steeple
	greeting	reason	teapot
	meeting	seaport	
	peapod	secret	
/ɛ/	dental	mention	tension
	kennel	penpal	
	lesson	pension	
	mental	rental	

Table continues.

Appendix D
 Pilot Word List: First Syllable Stress

First syllable vowel			
/e/	cagey	Mayday	ranger
	daylight	painful	takeout
	daytime	payday	
	mangy	raindrop	
/ʌ/	bunny	gunshot	sunny
	cuddly	honey	
	funnel	money	
	funny	runny	
/ɪ/	killer	pillar	willow
	killjoy	pillow	witty
	kitchen	pinprick	
	kitty	silver	
/o/	doughboy	poet	Toby's
	doughnut	rowboat	
	nowhere	showman	
	open	snowman	
/æ/	bandage	canvass	Mandy's
	candy	captive	

Note. These words acted as foils in the citation form word list. A subset were chosen to act as foils in the experimental sentences.

Table continues.

Appendix D
Pilot Word List: First Syllable Stress

First syllable vowel				
/U/	book	cooking	hook	rook
	bookbag	cookout	hooked	rookie
	bush	crook	lookout	rookie's
	bushy	foot	nook	rook's
	cooked	full	poor	shook
	cooker	good	pulled	wood
	cookie	hood	push	wool
	Cookie's	hoof	pushed	

Appendix E
Pilot Word List: Foils

baywatch	dinner	lunchtime
bearhug	gamble	Melvin
breakfast	Georgy	Newport
city	highschool	pupil
costume	Kathy	teacher
deepen	knowledge	tiny
depress	license	

Note. Foils were placed as the last word on each page in the citation form word list.

Appendix F.

Word frequency table

0705200012060070000680003484492549405000439	NN S	ANTIQUÉ &n tik &n'tik 02
0805200014070120000870000000000000000000	NN S N	APPLAUSE -/plOz -'plOz 02
0700300016070150002320003516325397431000000	O S	ASHAMED
0705200016070150002320003516325397431000000	JJ R	ASHAMED -/SeImd -'SeImd 02
0605200002020020000150000000000000000000	NN S	ATTEST -/test -'test 02
0605200002020020000150000000000000000000	VV S	ATTEST -/test -'test 02
0706200001010010000240000000000000000000	NN OO	AUGMENT Og/m-nt Ogm-nt 20
0706200001010010000240000000000000000000	VV SO	AUGMENT Og/ment Og'ment 02
05042000460601600005900030000000000000000	NN S	AWARD -/wOd -'wOd 02
05042000460601600005900030000000000000000	VV S	AWARD -/wOd -'wOd 02
0704200004040040000000000000000000000000	JJ	AWESOME O/s-m 'Os-m 20
0605200000000000000090000000000000000000	NN S	BABOON b-/bun b-'bun 02
06042000451001700001400040000000000000000	NN F	BALLET b&/leI 'b&leI 20
0705200010070080000690000520623583394000000	V	BALLOON b-'lun
0705200010070080000690000520623583394000000	NN S	BALLOON b-/lun b-'lun 02
0600200000000000000020000000000000000000	V	BAMBOO
0605200000000000000020000000000000000000	NN S	BAMBOO b&m/bu b&m'bu 02
0806200016020020000100000000000000000000	NN S	BLOCKADE bl0/keId bl0'keId 02
0806200016020020000100000000000000000000	VV S	BLOCKADE bl0/keId bl0'keId 02
07062000000000000000110001000000000000000	NN SO	BOMBARD b0m/bAd b0mbAd 20
07062000000000000000110001000000000000000	VV SO	BOMBARD b0m/bAd b0m'bAd 02
0600000000000000000000000000000000000000	N C	BOMBAY b0m'beI
0600200008040060000000000000000000000000	J S C	BRAZIL
0600200008040060000000000000000000000000	N S C	BRAZIL br-'zIl
0600200008040060000000000000000000000000	O S C	BRAZIL
0700200003020030000230000298540416000000592	J S	BROCADE
0700200003020030000230000298540416000000592	V S	BROCADE br-'keId
0706200003020030000230000298540416000000592	NN S	BROCADE br-/keId br-'keId 02
0806200000000000000000000000000000000000	JJ S	BRUNETTE bru/net brunet 02
0806200000000000000000000000000000000000	NN S	BRUNETTE bru/net bru'net 02
0700200001010010000020000262418393275450000	J S	BUFFOON
0700200001010010000020000262418393275450000	V A	BUFFOON
0705200001010010000020000262418393275450000	NN S	BUFFOON bV/fun b-'fun 02
0705200000000000000000000000000000000000	NN S	CABOOSE k-/bus k-'bus 02
0505200004040040000090000000000000000000	NN S	CADET k-/det k-'det 02
08002000811203700030600010000000000000000	J S	CAMPAIGN
08062000811203700030600010000000000000000	NN S	CAMPAIGN k&m/peIn k&m'peIn
08062000811203700030600010000000000000000	VV	CAMPAIGN k&m/peIn k&m'peIn
0504200007040040000610000441623602000000394	NN S	CANOE k-/nu k-'nu 02

Table continues.

Appendix F.

Word frequency table

0504200007040040000610000441623602000000394 VV S	CANOE k-/nu k-'nu 02
0706200002010010000140001490587540408000436 NN S	CANTEEN k&n tin k&n'tin 02
06042000671304600031700095893734180000005142NN S	CAREER k-/rI- k-'rI-2 02
06042000671304600031700095893734180000005142VV S	CAREER k-/rI- k-'rI-2 02
0700200003030030000250000000000000000000 V S	CARTOON kA'tun
0705200003030030000250000000000000000000 NN S	CARTOON kA/tun kA'tun 02
0700200001010010000180000000000000000000 V S	CASCADE k&'skeld
0706200001010010000180000000000000000000 NN S	CASCADE k&s/keId k&'skeId 02
080020000000000000000000090000000000000000 N F	CASSETTE k-'set
0600000000000000000000000000000000000000 N C	CEYLON sI'lon
1000200000000000000000000000000000000000 N F N	CHARTREUSE SA'tr3z
0805200000000000000000000000000000000000 NN S N	CHENILLE S-/nil S-'nil 02
070520000000000000000780000000000000000000 NN F N	CHIFFON SI/'f0n 'Sif0n 20
0705200001010010000000000000000000000000 NN S N	COCAINE k-/keIn k-'U'keIn 02
0700200009030040000050000407576586000000494 N S C	COLOGNE k-'l-Un
070620001001001000014000300000000000000000 VV S	COMMUTE k-/mjut k-'mjut 02
080720000202002000021000000000000000000000 NN S	COMPRESS k0m/pres 'k0mpres 20
08072000020200200002100000000000000000000 VV S	COMPRESS k-m/pres k-m'pres
070020000603005000087000000000000000000000 J SB	CONVICT
070020000603005000087000000000000000000000 O SB	CONVICT
070020000603005000087000000000000000000000 P SB	CONVICT
070720000603005000087000000000000000000000 NN SB	CONVICT k0n/vIkt 'k0nvIkt 20
070720000603005000087000000000000000000000 VV SB	CONVICT k-n/vIkt k-n'vIkt 02
07062000080500500003600010000000000000000000 NN S	CRUSADE kru/seId kru'seId 02
07062000080500500003600010000000000000000000 VV S	CRUSADE kru/seId kru'seId 02
060020000303003000010000000000000000000000 V O	DEMURE
0605200003030030000100000000000000000000002JJ S	DEMURE dI/mjU- dI'mjU-2 02
070620000101001000062000000000000000000000 VV S	DEPRESS dI/pres dI'pres 02
0700 N C	DETROIT dI'troIt
070620000403004000012000000000000000000000 JJ S	DIFFUSE dI/fjus dI'fjus 02
070620000403004000012000000000000000000000 VV S	DIFFUSE dI/fjuz dI'fjuz 02
06042000911306100126600276215425705390000002NN S	DINNER dI/n-'dIn-2 20
0806200005020050000660001000000000000000000 NN S	DISGUISE dIs/galz dIs'galz 02
0806200005020050000660001000000000000000000 VV S	DISGUISE dIs/galz dIs'galz 02
0605200034080200001010001000000000000000000 JJ S	DIVINE dI/vaIn dI'vaIn 02
0605200034080200001010001000000000000000000 NN S	DIVINE dI/vaIn dI'vaIn 02
0605200034080200001010001000000000000000000 VV S	DIVINE dI/vaIn dI'vaIn 02
060520000904009000018000000000000000000000 NN S	DOMAIN d-/meIn d-'U'meIn 02
0600 N C	DOREEN 'dOrin

Table continues.

Appendix F.

Word frequency table

0605200000000000000016000000000000000000 JJ S	MMUNE I/mjun I'mjun 02
0800000000000000000000000000000000000000QP	IMPAIRED Im'pe-d Q
0800000000000000000000000000000000000000QV	IMPAIRED Im'pe-d Q
0605200000000000000040000000000000000000 VV S	IMPALE Im/pel Im'peI 02
0605200004040040000210000000000000000000 VV S	IMPART Im/pAt Im'pAt 02
0700200000000000000030000000000000000000 N S	IMPEACH
0706200000000000000030000000000000000000 VV S	IMPEACH Im/pitS Im'pitS 02
0605200000000000000060000000000000000000 VV S	IMPEDE Im/pid Im'pid 02
0505200000000000000028000000000000000000 VV S	IMPEL Im/pel Im'pel 02
0706200003030030000000000000000000000000 VV S	IMPINGE Im/pIndZ Im'pIndZ 02
0707200001010010000100000000000000000000 NN O	IMPLANT Im/plAnt ImplAnt 20
0707200001010010000100000000000000000000 VV SO	IMPLANT Im/plAnt Im'plAnt 02
050520001206011000080000100000000000000000 VV S	IMPLY Im/plaI Im'plaI 02
060020000905008000098000100000000000000000 N O	IMPOSE
060520000905008000098000100000000000000000 VV S	IMPOSE Im/p-Uz Im'p-Uz 02
070020000403004000177000200000000000000000 J RB	IMPRESS
070620000403004000177000200000000000000000 NN SB	IMPRESS Im/pres 'Impres 20
070620000403004000177000200000000000000000 VV SB	IMPRESS Im/pres Im'pres 02
09003000301102500000000030000000000000000QP	IMPRESSED Im'prest Q
09003000301102500000000030000000000000000QV	IMPRESSED Im'prest Q
09003000301102500000000030000000000000000QO S	IMPRESSED
080000000000000000000000020000000000000000QP	IMPROVED Im'pruvd Q
080000000000000000000000020000000000000000QV	IMPROVED Im'pruvd Q
0600200000000000000040000000000000000000 V O	IMPURE
06052000000000000000400000000000000000002JJ S	IMPURE Im/pjU- Im'pjU-2 02
0500200001010010000190000000000000000000 N S	INANE
0504200001010010000190000000000000000000 JJ S	INANE I/neIn I'neIn 02
0605200162151190005450058000000000000000000 AO SO	INDEED In/did In'did 02
0605200162151190005450058000000000000000000 OO O	INDEED In/did Indid 02
06062000000000000000050000000000000000000 NN S	INDENT In/dent 'Indent 20
06062000000000000000050000000000000000000 VV S	INDENT In/dent In'dent 02
070020000503005000068000000000000000000000 J O	INDOORS
070520000503005000068000000000000000000000 AO S	INDOORS In/dOz ,In'dOz 22
0606200009040090000730000448000300000000000 VV S	INDUCE In/djus In'djus 02
0505200002020020000110000000000000000000 JJ S	INEPT I/nept I'nept 02
06002000010100100003400000000000000000000 N S	INFECT
06002000010100100003400000000000000000000 O O	INFECT
06062000010100100003400000000000000000000 VV S	INFECT In/fekt In'fekt 02
050020000101001000016000100000000000000000 N S	INFER
050420000101001000016000100000000000000002VV S	INFER In/f3 In'f32 02
06002000010100100001400000000000000000000 J O	INFEST
06062000010100100001400000000000000000000 VV S	INFEST In/fest In'fest 02
060020000101001000003000100000000000000000 J S	INFIRM In'f3m

Table continues.

Appendix F.

Word frequency table

07062000171001700008500014343203543620000002JJ S	OBSCURE b/skjU- b'skjU-
07062000171001700008500014343203543620000002VV S	OBSCURE b/skjU- b'skjU-
0606200000000000000000000000000000000000 JJ S	OBTUSE b/tjus -b'tjus 02
0605200000000000000000000000000000000000 N O Y	OCCULT 0'kVlt
0605200000000000000000000000000000000000 JJ SO	OCCULT 0'kVlt 0'kVlt 02
0605200000000000000000000000000000000000 VV SO	OCCULT 0'kVlt 0'kVlt 02
0403200020060150000710000555245269414000000 A	OKAY ,-U'kel
0403200020060150000710000555245269414000000 J	OKAY ,-U'kel
0403200020060150000710000555245269414000000 N Y	OKAY ,-U'kel
0403200020060150000710000555245269414000000 OO	OKAY U/ke U/ke 22
0403200020060150000710000555245269414000000 VV	OKAY U/ke ,-U'ke 22
040420000101001000073000000000000000000000000 VV S	OMIT U/mt U/mt 02
060030000603006000012000000000000000000000000 N S	OPAQUE
0604200006030060000120000000000000000000000000 JJ S	OPAQUE U/peIk U'peIk 02
06042000030200300005700010000000000000000000000 NN S	ORDEAL O/dil O'dil 02
06002000010100100001900004013394193700000000 P O	ORNATE
06002000010100100001900004013394193700000000 V O	ORNATE
06042000010100100001900004013394193700000000 JJ S	ORNATE O/neIt O'neIt 02
0504200011040100000040000000000000000000000000 JJ S	OVERT U/v3t U'v3t 20
07002000251202500009600020000000000000000000000 J S	PAINFUL 'peInf-
07052000 NN F	PAPOOSE p-/pus p-'pus 02
0605200025100170001000000526523578463000000 NN S	PARADE p-/reId p-'reId 02
0605200025100170001000000526523578463000000 VV S	PARADE p-/reId p-'reId 02
0600200005020030000280000000000000000000000000 J S	PAROLE
0605200005020030000280000000000000000000000000 NN S N	PAROLE p-/r-U p-'r-U 02
0605200005020030000280000000000000000000000000 VV S	PAROLE p-/r-U p-'r-U 02
07002000010100100000000000000000000000000000000 V S	PARQUET
07042000010100100000000000000000000000000000000 NN S N	PARQUET pA/ke 'pAke 20
06002000030300300004000000000000000000000000000 J S	PASTEL
060620000303003000040000000000000000000000000000 NN S	PASTEL p&s/te 'p&st 02
070620000702002000007000100000000000000000000000 NN \$	PLATOON pl-/tun pl-'tun 02
0404200099120380000840002544552518000536000 NN S	POET p-U/It 'p-UIt 20
07002000 V S	PONTOON
07062000 NN S	PONTOON p0n/tun p0n'tun 02
07062000030300300007500000000000000000000000000 VV S	PRECEDE pri/sid prl'sid 02
0700 N	PREVIEW 'privju
0700 V	PREVIEW 'privju
08072000130600700006300000000000000000000000000 VV S	PROCLAIM pr-/kleIm pr-
07062000040100200003200000000000000000000000002VV S	PROCURE pr-/kjU- pr-'kj
07002000010100100001300000000000000000000000000 N S	PROFANE
07062000010100100001300000000000000000000000000 JJ S	PROFANE pr-/feIn pr-'feIn 02
07062000010100100001300000000000000000000000000 VV S	PROFANE pr-/feIn pr-'feIn 02
07072000931305800017500160000000000000000000000 NN S	PROJECT pr0/dZekt 'pr0dZekt 20

Table continues.

Appendix F.

Word frequency table

07072000931305800017500160000000000000000 VV S	PROJECT pr-/dZekt pr-'dZekt
070620000904005000028000100000000000000000 NN S	QUARTET kwO/tet kwO'tet 02
0700000000000000000000000000000000000000 N	RACCOON r-'kun
0605200000000000000000000000000000000000 NN S	RATTAN r-/t&n r't&n 02
050520001507013000043000100000000000000000 VV S	REACT r &kt r'l'&kt 02
0500200018070130001150000448439497000000461 J SB	REBEL
0504200018070130001150000448439497000000461 NN SB	REBEL re/bl 'reb-l 20
0505200018070130001150000448439497000000461 VV SB	REBEL r /bel r'l'bel 02
0706200005050050000200000000000000000000 VV S	REBUILD r /bIld ,r'l'bIld 22
070000000000000000000000020000000000000000 P	REBUILT ,r'l'bIlt
070000000000000000000000020000000000000000 V	REBUILT ,r'l'bIlt
0600200002020020000210000000000000000000 N S	REBUKE r'l'bjuk
0606200002020020000210000000000000000000 VV S	REBUKE r /bjuk r'l'bjuk 02
0505200006020020000000000000000000000000 VV S	REBUT r /bVt r'l'bVt 02
06062000000000000000080000000000000000000 VV S	RECANT r /k&nt r'l'k&nt 02
0700200002020020000160000000000000000000 N R	RECLAIM
0706200002020020000160000000000000000000 VV S	RECLAIM r /kleIm r'l'kleIm 02
0706200010040080000510000523325370418000000 NN S	REFRAIN r /freIn r'l'freIn 02
0706200010040080000510000523325370418000000 VV S	REFRAIN r /freIn r'l'freIn 02
0600200016070160005640001518426419437000394 J SB	REFUSE
0606200016070160005640001518426419437000394 NN SB N	REFUSE re/fjus 'refjus 20
0606200016070160005640001518426419437000394 VV SB	REFUSE r /fjuz r'l'fjuz 02
060620001006009000051000100000000000000000 NN S	REJECT r /dZekt r'l'dZekt 20
060620001006009000051000100000000000000000 VV S	REJECT r /dZekt r'l'dZekt 02
0504200002020020000140000000000000000000 NN	RELAY r /leI 'rileI 02
0504200002020020000140000000000000000000 NN	RELAY r /leI rileI 22
0504200002020020000140000000000000000000 NN S	RELAY r /leI rileI 22
0504200002020020000140000000000000000000 VV	RELAY r /leI r'l'leI 22
0504200002020020000140000000000000000000 VV S	RELAY r /leI rileI 22
0606200000000000000000000000000000000000 NN SO N	REMAND r /mAnd r'l'mAnd 02
0606200000000000000000000000000000000000 VV SO	REMAND r /mAnd r'l'mAnd 02
0606200000000000000024000000000000000000 JJ S	ROBUST r-/bVst r-'U'bVst 02
0705200000000000000030000000000000000000 NN S	ROSETTE r-/U/zet r-'U'zet 02
0600200001010010000000000000000000000000 N R	ROTUND
0606200001010010000000000000000000000000 JJ S	ROTUND r-/U'tVnd r-'U'tVnd 02
0805200004040040000170000000000000000000 NN F N	ROULETTE ru/let ru'let 02
0705200035130310001620005523000341000000000 J	ROUTINE ru'tin
0705200035130310001620005523000341000000000 NN S	ROUTINE ru'tin ru'tin 02
0707200010050090000090000451485480000000428 NN S	SEGMENT seg/m-nt 'seg
0707200010050090000090000451485480000000428 VV S	SEGMENT seg/m-nt seg'ment 20
0600200010070090000680000000000000000000 N O	SERENE
0600200010070090000680000000000000000000 V R	SERENE
0605200010070090000680000000000000000000 JJ S	SERENE sI/rin sI'rin 02

Table continues.

Appendix G

Word List: Words Placed in Experimental Sentences

S1 Vowels	Experimental Words (N = 59)			
/i/	preempt (0)	rebuild (5)	react (15)	
/aə/	cartoon (3)	harpoon (0)	chartreuse (0)	parquet (1)
/a/	blockade (2)	stockade (12)	pontoon (0)	
e/	Bayonne(0)			
/æ/	antique (12)	cafe (0)	cascade (1)	taboo (0)
	ballet (45)	campaign (81)	flambeau (0)	
	bamboo (0)	canteen (20)	tableau (1)	
/I/	imbed (0)	impose (9)	improved (0)	intense (40)
	immune (0)	impressed (30)	inept (2)	
	impaired(0)	impure (0)	infirm (1)	
/ɛ/	festoon (0)	technique (60)		
/ə/	thirteen (11)			
/ə/	applause (14) *	Brazil (8) *	career (67) *	maroon (3) *
	balloon (10) *	canoe (7) *	macaw (0) *	
/ɜ/	fourteen (31)	Georgine's (0)	ordeal (3)	Pauline's (0)
	Georgette's (0)	Maurice (0)	ornate (1)	
/u/	crusade (80)	lunette (0)	U.N. (0)	unite (10)
	duet (1)	roulette (4)	U.2. (0)	
/o/	cocaine (1)	obese (0)	Roseanne	
	domain (9)	overt(0)	rotund (1)	
	hotel (26)	profane (1)	rosette (0)	
	Jose (0)	robust (0)		
/aɪ/	Chinese (0)			

Note. The frequency of occurrence is presented in parenthesis following each word (Kucera & Francis, 1967). Certain words were not found in the frequency chart, such as proper nouns. These words are followed by a zero in parenthesis. Words that were excluded from the final analysis are marked by asterisks. Exclusion was based on the variable production of the vowel in S1 of these words.

Appendix H.

Score sheet: perceptual analysis

	Subject	context	Position	PA	SH	PASH
1	female	sc	1	13	1	14
	female	nc	1	5	2	7
	female	sc	2	17	8	25
	female	nc	2	8	5	13
2	female	sc	1	17	7	24
	female	nc	1	11	0	11
	female	sc	2	6	10	16
	female	nc	2	4	1	5
3	female	sc	1	20	6	26
	female	nc	1	18	2	20
	female	sc	2	11	9	20
	female	nc	2	9	2	11
4	female	sc	1	12	5	17
	female	nc	1	6	2	8
	female	sc	2	5	6	11
	female	nc	2	1	2	3
5	female	sc	1	10	6	16
	female	nc	1	3	3	6
	female	sc	2	5	8	13
	female	nc	2	6	2	8

Note. Raw scores of female participants ($n = 5$) are presented as an example of scoring for stress clash (SC) versus non-clash (NC) context and early-sentence (1) versus late-sentence (2) position. Scores are also based on the judgment of stress shift with pitch accent judged to fall on S1 of the words that were judged to shift (PA), the judgment of stress shift with pitch accent judged to not fall on S1 of the words that were judged to shift (SH), and the judgment of stress shift for all words, with and without pitch accent judged to fall on S1 of the words that were judged to shift (PASH).

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
1	female	cartoon	sc	1	1	N	N	175	217	78
1	female	cartoon	sc	1	2	N	N	190	316	74
1	female	cartoon	sc	1	1	Y	N	172	211	71
1	female	cartoon	nc	1	1	N	N	175	179	73
1	female	cartoon	nc	1	2	N	N	204	268	74
1	female	cartoon	nc	1	1	N	N	162	219	75
1	female	cartoon	nc	1	2	N	N	172	235	69
1	female	chartreuse	sc	1	2	Y	N	204	280	63
1	female	chartreuse	sc	1	1	N	N	175	245	65
1	female	chartreuse	sc	1	2	N	N	183	421	62
1	female	chartreuse	nc	1	1	N	N	162	229	69
1	female	chartreuse	nc	1	2	N	N	190	324	70
1	female	chartreuse	nc	1	1	N	N	175	222	73
1	female	harpoon	sc	1	1	N	N	175	187	72
1	female	harpoon	sc	1	1	N	N	187	189	76
1	female	harpoon	sc	1	2	N	N	193	290	71
1	female	harpoon	nc	1	2	Y	N	225	247	61
1	female	harpoon	nc	1	1	N	N	167	150	73
1	female	harpoon	nc	1	2	N	N	190	274	68
1	female	parquet	sc	1	2	Y	N	193	225	66
1	female	parquet	sc	1	2	Y	N	187	161	67
1	female	parquet	nc	1	1	Y	N	184	181	60
1	female	parquet	nc	1	2	Y	N	187	199	55
1	female	parquet	nc	1	1	N	N	187	195	74
1	female	parquet	nc	1	2	N	N	212	183	74
1	female	blockade	sc	1	1	N	N	172	167	70
1	female	blockade	sc	1	2	Y	N	172	271	60
1	female	blockade	nc	1	1	N	N	162	188	78
1	female	blockade	nc	1	2	N	N	187	285	73
1	female	blockade	nc	1	1	Y	N	162	201	59
1	female	blockade	nc	1	2	Y	N	172	218	60
1	female	stockade	sc	1	1	N	N	175	292	73
1	female	stockade	sc	1	1	Y	N	167	296	67
1	female	stockade	sc	1	2	Y	N	172	247	64
1	female	stockade	nc	1	1	N	N	167	305	73
1	female	stockade	nc	1	2	N	N	190	292	73
1	female	stockade	nc	1	1	N	N	160	288	74
1	female	antique	sc	1	2	Y	N	216	195	65
1	female	antique	sc	1	2	Y	N	208	160	59
1	female	antique	nc	1	1	Y	N	172	188	65
1	female	antique	nc	1	2	Y	N	187	116	57
1	female	ballet	sc	1	2	Y	N	181	160	69
1	female	ballet	sc	1	2	Y	N	167	175	66
1	female	ballet	nc	1	1	N	N	175	218	77
1	female	ballet	nc	1	2	N	N	190	222	72
1	female	ballet	nc	1	1	N	N	162	184	74
1	female	ballet	nc	1	2	N	N	155	227	74
1	female	bamboo	sc	1	1	Y	N	172	274	62

Note. Number refers to subject (1-10), context to stress clash (SC) versus non-clash (NC), shift (SH), pitch accent on S1 (PA), Fundamental frequency (F0), duration (ms), and intensity (dB). Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
1	female	bamboo	sc	1	1	Y	N	153	220	65
1	female	bamboo	sc	1	2	Y	N	155	123	64
1	female	bamboo	nc	1	1	N	N	172	159	68
1	female	bamboo	nc	1	2	N	N	184	290	67
1	female	bamboo	nc	1	1	N	N	160	169	76
1	female	bamboo	nc	1	2	N	N	162	153	76
1	female	cafe	sc	1	1	N	N	172	209	67
1	female	cafe	sc	1	1	Y	N	160	213	71
1	female	cafe	sc	1	2	Y	N	167	286	68
1	female	cafe	nc	1	1	N	N	184	191	70
1	female	cafe	nc	1	2	N	N	193	274	70
1	female	cafe	nc	1	1	N	N	184	186	73
1	female	canteen	sc	1	1	N	N	190	247	63
1	female	canteen	sc	1	1	N	N	167	257	70
1	female	canteen	sc	1	2	N	N	183	336	73
1	female	canteen	nc	1	1	N	N	190	282	71
1	female	canteen	nc	1	2	N	N	225	274	71
1	female	canteen	nc	1	1	Y	N	175	205	61
1	female	canteen	nc	1	2	Y	N	167	254	61
1	female	cascade	sc	1	2	Y	N	184	159	65
1	female	cascade	sc	1	1	Y	N	193	265	62
1	female	cascade	sc	1	2	Y	N	181	245	63
1	female	cascade	nc	1	1	N	N	180	322	70
1	female	cascade	nc	1	2	N	N	200	210	68
1	female	cascade	nc	1	1	N	N	167	311	72
1	female	cascade	nc	1	2	N	N	175	289	72
1	female	flambeau	sc	1	2	Y	N	190	155	69
1	female	flambeau	sc	1	2	Y	N	184	203	68
1	female	flambeau	nc	1	1	N	N	190	392	75
1	female	flambeau	nc	1	2	N	N	190	320	76
1	female	flambeau	nc	1	1	N	N	190	327	73
1	female	flambeau	nc	1	2	N	N	184	386	73
1	female	taboo	sc	1	1	N	N	167	162	74
1	female	taboo	sc	1	1	N	N	190	200	73
1	female	taboo	sc	1	2	N	N	181	179	70
1	female	taboo	nc	1	1	N	N	201	139	75
1	female	taboo	nc	1	2	N	N	212	166	75
1	female	taboo	nc	1	1	Y	N	184	191	68
1	female	impure	sc	1	2	Y	N	212	235	73
1	female	impure	sc	1	2	Y	N	172	302	67
1	female	impure	nc	1	1	N	N	201	132	71
1	female	impure	nc	1	2	Y	N	187	377	62
1	female	inept	sc	1	1	N	N	151	87	61
1	female	inept	sc	1	2	Y	N	167	99	67
1	female	inept	nc	1	1	N	N	151	54	67
1	female	inept	nc	1	2	N	N	172	315	75
1	female	inept	nc	1	2	Y	N	167	188	66
1	female	thirteen	sc	1	2	Y	N	204	285	58

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
1	female	thirteen	sc	1	2	Y	N	190	296	55
1	female	thirteen	nc	1	1	N	N	201	253	70
1	female	thirteen	nc	1	2	N	N	204	313	67
1	female	thirteen	nc	1	1	N	N	190	171	73
1	female	thirteen	nc	1	2	N	N	201	268	70
1	female	fourteen	sc	1	2	Y	N	208	260	65
1	female	fourteen	sc	1	2	Y	N	216	257	69
1	female	fourteen	nc	1	2	Y	N	212	289	66
1	female	fourteen	nc	1	2	Y	N	200	198	64
1	female	Maurice	sc	1	1	N	N	175	231	74
1	female	Maurice	sc	1	1	Y	N	167	218	68
1	female	Maurice	sc	1	2	Y	N	153	212	64
1	female	Maurice	nc	1	1	N	N	175	234	74
1	female	Maurice	nc	1	2	N	N	225	340	74
1	female	Maurice	nc	1	1	N	N	162	202	71
1	female	ornate	sc	1	1	N	N	175	161	71
1	female	ornate	sc	1	2	Y	N	175	213	68
1	female	ornate	nc	1	1	N	N	162	131	67
1	female	ornate	nc	1	2	N	N	183	174	66
1	female	ornate	nc	1	2	Y	N	172	306	67
1	female	duet	sc	1	1	N	N	167	141	76
1	female	duet	sc	1	2	Y	N	184	178	68
1	female	duet	nc	1	1	N	N	184	87	78
1	female	duet	nc	1	2	N	N	187	216	78
1	female	duet	nc	1	1	N	N	172	159	68
1	female	crusade	sc	1	1	N	N	190	158	74
1	female	crusade	sc	1	1	N	N	167	142	66
1	female	crusade	sc	1	2	N	N	172	301	71
1	female	crusade	nc	1	1	N	N	204	164	57
1	female	crusade	nc	1	2	N	N	212	344	62
1	female	crusade	nc	1	1	Y	N	208	150	70
1	female	crusade	nc	1	2	Y	N	190	299	65
1	female	U2	sc	1	2	Y	N	208	204	63
1	female	U2	sc	1	2	Y	N	212	210	61
1	female	U2	nc	1	1	N	N	193	166	70
1	female	U2	nc	1	2	N	N	208	232	71
1	female	U2	nc	1	1	N	N	187	178	69
1	female	UN	sc	1	2	Y	N	172	205	70
1	female	UN	sc	1	2	Y	N	165	219	61
1	female	UN	nc	1	1	N	N	201	144	71
1	female	UN	nc	1	2	N	N	208	121	72
1	female	UN	nc	1	1	N	N	187	215	74
1	female	hotel	sc	1	1	N	N	172	129	66
1	female	hotel	sc	1	1	Y	N	165	140	65
1	female	hotel	sc	1	2	Y	N	160	210	63
1	female	hotel	nc	1	1	N	N	181	137	70
1	female	hotel	nc	1	2	N	N	193	248	68
1	female	hotel	nc	1	1	N	N	167	83	64

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
1	female	Jose	sc	1	1	N	N	172	245	72
1	female	Jose	sc	1	1	Y	N	175	195	66
1	female	Jose	sc	1	2	Y	N	175	246	65
1	female	Jose	nc	1	1	N	N	186	298	77
1	female	Jose	nc	1	2	N	N	184	333	75
1	female	Jose	nc	1	2	Y	N	162	386	65
1	female	profane	sc	1	1	N	N	181	204	76
1	female	profane	sc	1	2	Y	N	172	335	53
1	female	profane	nc	1	1	N	N	181	178	64
1	female	profane	nc	1	2	N	N	201	323	62
1	female	profane	nc	1	2	Y	N	184	363	61
1	female	robust	sc	1	2	Y	N	181	197	66
1	female	robust	sc	1	2	Y	N	178	295	64
1	female	robust	nc	1	2	Y	N	183	215	59
1	female	robust	nc	1	1	N	N	172	127	68
1	female	robust	nc	1	2	N	N	172	226	68
1	female	rotund	sc	1	1	N	N	167	130	75
1	female	rotund	sc	1	2	Y	N	172	293	64
1	female	rotund	nc	1	2	Y	N	193	261	64
1	female	rotund	nc	1	2	Y	N	172	262	67
1	female	Chinese	sc	1	2	Y	N	208	226	62
1	female	Chinese	sc	1	2	Y	N	204	261	64
1	female	Chinese	nc	1	2	Y	N	200	210	60
1	female	Chinese	nc	1	1	Y	N	200	233	64
1	female	Chinese	nc	1	2	Y	N	175	250	62
2	female	preempt	sc	1	1	N	N	190	195	66
2	female	preempt	sc	1	2	N	N	190	303	70
2	female	preempt	sc	1	2	Y	N	184	309	72
2	female	preempt	nc	1	1	N	N	184	251	68
2	female	preempt	nc	1	2	N	N	208	260	69
2	female	preempt	nc	1	1	N	N	162	185	74
2	female	preempt	nc	1	2	N	N	162	262	78
2	female	rebuild	sc	1	1	N	N	208	102	79
2	female	rebuild	sc	1	2	N	N	225	214	83
2	female	rebuild	sc	1	1	N	N	190	177	68
2	female	rebuild	sc	1	2	N	N	190	208	70
2	female	rebuild	nc	1	2	Y	N	201	336	71
2	female	rebuild	nc	1	1	N	N	162	154	71
2	female	rebuild	nc	1	2	N	N	162	208	73
2	female	parquet	sc	1	1	Y	N	190	128	71
2	female	parquet	sc	1	2	Y	N	172	141	61
2	female	parquet	nc	1	1	N	N	184	134	75
2	female	parquet	nc	1	2	N	N	193	257	70
2	female	parquet	nc	1	1	N	N	145	143	66
2	female	parquet	nc	1	2	N	N	167	330	67
2	female	blockade	sc	1	1	N	N	167	198	74
2	female	blockade	sc	1	2	Y	N	167	217	72
2	female	blockade	nc	1	1	N	N	187	155	75

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
2	female	blockade	nc	1	2	N	N	190	283	68
2	female	blockade	nc	1	1	N	N	151	168	71
2	female	blockade	nc	1	2	N	N	153	257	70
2	female	pontoon	sc	1	1	N	N	187	207	72
2	female	pontoon	sc	1	2	N	N	245	303	79
2	female	pontoon	sc	1	1	N	N	155	205	66
2	female	pontoon	sc	1	2	N	N	201	320	69
2	female	pontoon	nc	1	2	Y	N	212	318	64
2	female	pontoon	nc	1	2	Y	N	212	309	67
2	female	antique	sc	1	1	Y	N	190	145	66
2	female	antique	sc	1	1	Y	N	172	191	68
2	female	antique	nc	1	2	Y	N	225	258	74
2	female	antique	nc	1	2	Y	N	155	275	67
2	female	ballet	sc	1	2	Y	N	208	159	66
2	female	ballet	nc	1	2	Y	N	162	198	66
2	female	ballet	nc	1	1	N	N	180	237	79
2	female	ballet	nc	1	2	N	N	190	300	74
2	female	ballet	nc	1	1	N	N	136	178	64
2	female	ballet	sc	1	2	N	N	121	180	64
2	female	bamboo	sc	1	1	N	N	181	194	73
2	female	bamboo	sc	1	2	N	N	216	332	74
2	female	bamboo	sc	1	1	Y	N	147	164	70
2	female	bamboo	sc	1	2	Y	N	141	111	66
2	female	bamboo	nc	1	1	N	N	190	176	70
2	female	bamboo	nc	1	2	N	N	193	196	72
2	female	bamboo	nc	1	1	N	N	151	243	68
2	female	bamboo	nc	1	2	N	N	162	322	67
2	female	cafe	sc	1	1	Y	N	208	131	75
2	female	cafe	sc	1	1	N	N	162	190	62
2	female	cafe	sc	1	2	N	N	162	335	64
2	female	cafe	nc	1	1	N	N	181	184	74
2	female	cafe	nc	1	2	N	N	181	343	74
2	female	cafe	nc	1	1	N	N	160	175	64
2	female	cafe	nc	1	2	N	N	208	187	65
2	female	campaign	sc	1	1	Y	N	208	231	72
2	female	campaign	sc	1	1	Y	N	175	164	62
2	female	campaign	sc	1	2	Y	N	167	252	62
2	female	campaign	nc	1	1	N	N	201	254	71
2	female	campaign	nc	1	2	N	N	187	263	65
2	female	campaign	nc	1	1	N	N	190	204	76
2	female	campaign	nc	1	2	N	N	204	220	76
2	female	cascade	sc	1	2	Y	N	193	268	65
2	female	cascade	sc	1	1	Y	N	187	286	67
2	female	cascade	sc	1	2	Y	N	204	309	64
2	female	cascade	nc	1	2	Y	N	190	392	65
2	female	cascade	nc	1	1	N	N	187	300	67
2	female	cascade	nc	1	2	N	N	190	313	67
2	female	flambeau	sc	1	2	Y	N	187	141	68

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
2	female	flambeau	sc	1	1	N	N	167	147	67
2	female	flambeau	sc	1	2	N	N	167	126	66
2	female	flambeau	nc	1	1	N	N	193	326	72
2	female	flambeau	nc	1	2	N	N	193	225	70
2	female	flambeau	nc	1	1	N	N	190	272	65
2	female	flambeau	nc	1	2	N	N	151	210	64
2	female	tableau	sc	1	1	N	N	175	156	75
2	female	tableau	sc	1	2	N	N	181	304	76
2	female	tableau	sc	1	1	Y	N	193	222	72
2	female	tableau	sc	1	2	Y	N	184	274	66
2	female	tableau	nc	1	1	N	N	172	226	71
2	female	tableau	nc	1	2	N	N	181	379	71
2	female	tableau	nc	1	1	N	N	162	176	64
2	female	tableau	nc	1	2	N	N	167	232	65
2	female	impure	sc	1	2	Y	N	204	229	73
2	female	impure	sc	1	2	Y	N	187	349	74
2	female	impure	nc	1	2	Y	N	221	299	74
2	female	impure	nc	1	1	N	N	190	149	68
2	female	impure	nc	1	2	N	N	172	267	70
2	female	infirm	sc	1	2	Y	N	225	235	73
2	female	infirm	sc	1	1	N	N	184	163	70
2	female	infirm	sc	1	2	N	N	190	440	74
2	female	infirm	nc	1	2	Y	N	193	438	64
2	female	infirm	nc	1	1	N	N	190	178	63
2	female	infirm	nc	1	2	N	N	204	369	69
2	female	intense	sc	1	1	N	N	162	169	62
2	female	intense	sc	1	2	N	N	225	388	68
2	female	intense	sc	1	1	Y	N	172	131	63
2	female	intense	sc	1	2	Y	N	175	377	64
2	female	intense	nc	1	1	N	N	162	132	68
2	female	intense	nc	1	2	N	N	200	425	72
2	female	intense	nc	1	1	N	N	160	95	71
2	female	intense	nc	1	2	N	N	193	335	71
2	female	technique	sc	1	2	Y	N	193	171	65
2	female	technique	sc	1	1	N	N	172	117	68
2	female	technique	sc	1	2	N	N	172	149	68
2	female	technique	nc	1	1	N	N	190	187	69
2	female	technique	nc	1	2	N	N	212	290	68
2	female	technique	nc	1	1	N	N	167	150	72
2	female	technique	nc	1	2	N	N	172	218	69
2	female	thirteen	sc	1	2	Y	N	212	215	67
2	female	thirteen	sc	1	1	Y	N	193	123	65
2	female	thirteen	sc	1	2	Y	N	190	312	64
2	female	thirteen	nc	1	1	N	N	190	137	73
2	female	thirteen	nc	1	2	N	N	193	442	66
2	female	thirteen	nc	1	1	N	N	190	139	65
2	female	thirteen	nc	1	2	N	N	193	306	64
2	female	fourteen	sc	1	2	Y	N	256	274	67

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
2	female	fourteen	sc	1	2	Y	N	162	209	62
2	female	fourteen	nc	1	2	Y	N	217	297	64
2	female	fourteen	nc	1	1	Y	N	212	160	68
2	female	georgett	sc	1	1	Y	N	197	197	72
2	female	georgett	sc	1	2	Y	N	197	277	71
2	female	georgett	sc	1	1	N	N	167	176	70
2	female	georgett	sc	1	2	N	N	172	273	68
2	female	georgett	nc	1	2	N	N	212	277	76
2	female	georgett	nc	1	1	N	N	162	177	72
2	female	georgett	nc	1	2	N	N	160	348	71
2	female	georgine	sc	1	1	Y	N	201	186	68
2	female	georgine	sc	1	1	N	N	184	170	76
2	female	georgine	sc	1	2	N	N	175	287	70
2	female	georgine	nc	1	1	N	N	187	163	69
2	female	georgine	nc	1	2	N	N	193	315	70
2	female	georgine	nc	1	1	N	N	162	164	68
2	female	georgine	nc	1	2	N	N	167	294	68
2	female	ordeal	sc	1	1	Y	N	184	129	71
2	female	ordeal	sc	1	2	Y	N	181	297	71
2	female	ordeal	sc	1	1	N	N	153	134	70
2	female	ordeal	sc	1	2	N	N	160	329	72
2	female	ordeal	nc	1	1	N	N	181	122	72
2	female	ordeal	nc	1	2	N	N	187	259	73
2	female	ordeal	nc	1	1	N	N	141	129	63
2	female	ordeal	nc	1	2	N	N	145	228	66
2	female	ornate	sc	1	2	Y	N	190	136	66
2	female	ornate	sc	1	1	N	N	151	130	69
2	female	ornate	sc	1	2	N	N	151	263	69
2	female	ornate	nc	1	2	Y	N	193	218	67
2	female	ornate	nc	1	1	N	N	145	89	64
2	female	ornate	nc	1	2	N	N	147	241	67
2	female	U2	sc	1	2	Y	N	212	173	67
2	female	U2	sc	1	1	Y	N	181	96	69
2	female	U2	sc	1	2	Y	N	172	178	65
2	female	U2	nc	1	2	Y	N	181	322	72
2	female	U2	nc	1	1	N	N	175	119	71
2	female	U2	nc	1	2	N	N	193	419	72
2	female	UN	sc	1	1	Y	N	256	169	68
2	female	UN	sc	1	1	Y	N	159	127	62
2	female	UN	sc	1	2	Y	N	153	173	64
2	female	UN	nc	1	2	Y	N	193	131	63
2	female	UN	nc	1	2	Y	N	172	332	69
2	female	cocaine	sc	1	2	Y	N	225	252	66
2	female	cocaine	sc	1	1	N	N	187	140	67
2	female	cocaine	sc	1	2	N	N	191	319	61
2	female	cocaine	nc	1	1	N	N	160	81	62
2	female	cocaine	nc	1	2	N	N	155	296	61
2	female	cocaine	nc	1	1	N	N	167	104	66

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
2	female	cocaine	nc	1	2	N	N	200	289	67
2	female	hotel	sc	1	2	Y	N	245	207	73
2	female	hotel	sc	1	1	N	N	162	94	61
2	female	hotel	sc	1	2	N	N	190	228	65
2	female	hotel	nc	1	1	N	N	172	165	76
2	female	hotel	nc	1	2	N	N	183	279	76
2	female	hotel	nc	1	1	N	N	162	127	64
2	female	hotel	nc	1	2	N	N	212	278	68
2	female	overt	sc	1	2	Y	N	181	267	67
2	female	overt	sc	1	1	N	N	155	83	73
2	female	overt	sc	1	2	N	N	162	203	75
2	female	overt	nc	1	2	Y	N	184	285	65
2	female	overt	nc	1	1	N	N	151	87	75
2	female	overt	nc	1	2	N	N	162	314	78
2	female	rosanne	sc	1	2	Y	N	245	224	77
2	female	rosanne	sc	1	1	N	N	160	125	68
2	female	rosanne	sc	1	2	N	N	155	254	65
2	female	rosanne	nc	1	1	N	N	162	151	68
2	female	rosanne	nc	1	2	N	N	172	254	70
2	female	rosanne	nc	1	1	N	N	155	237	65
2	female	rosanne	nc	1	2	N	N	181	462	68
2	female	rotund	sc	1	2	Y	N	216	342	71
2	female	rotund	sc	1	1	N	N	160	146	66
2	female	rotund	sc	1	2	N	N	187	413	63
2	female	rotund	nc	1	1	N	N	167	171	65
2	female	rotund	nc	1	2	N	N	175	376	63
2	female	rotund	nc	1	1	Y	N	187	190	66
2	female	rotund	nc	1	2	Y	N	167	384	61
2	female	Chinese	sc	1	1	Y	N	175	213	64
2	female	Chinese	sc	1	1	Y	N	187	205	67
2	female	Chinese	sc	1	2	Y	N	167	190	61
2	female	Chinese	nc	1	1	N	N	216	162	76
2	female	Chinese	nc	1	1	N	N	181	187	66
2	female	Chinese	nc	1	2	N	N	175	189	63
3	male	preempt	sc	1	1	N	N	147	72	68
3	male	preempt	sc	1	2	N	N	147	301	68
3	male	preempt	sc	1	1	Y	N	160	132	65
3	male	preempt	sc	1	2	Y	N	167	217	62
3	male	preempt	nc	1	2	Y	N	193	249	66
3	male	preempt	nc	1	1	N	N	160	117	71
3	male	preempt	nc	1	2	N	N	172	174	70
3	male	rebuild	sc	1	2	Y	N	175	171	69
3	male	rebuild	sc	1	1	N	N	143	155	70
3	male	rebuild	sc	1	2	N	N	147	264	71
3	male	rebuild	nc	1	1	N	N	153	129	76
3	male	rebuild	nc	1	2	N	N	172	245	77
3	male	rebuild	nc	1	1	N	N	140	184	69
3	male	rebuild	nc	1	2	N	N	135	205	71

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
3	male	chartreuse	sc	1	2	Y	N	186	276	65
3	male	chartreuse	sc	1	1	N	N	183	304	78
3	male	chartreuse	sc	1	2	N	N	187	383	75
3	male	chartreuse	nc	1	1	N	N	151	249	71
3	male	chartreuse	nc	1	2	N	N	235	377	69
3	male	chartreuse	nc	1	1	N	N	187	270	78
3	male	chartreuse	nc	1	2	N	N	204	349	76
3	male	harpoon	sc	1	1	Y	N	196	103	75
3	male	harpoon	sc	1	1	N	N	155	150	77
3	male	harpoon	sc	1	2	N	N	155	256	71
3	male	harpoon	nc	1	2	Y	N	225	194	66
3	male	harpoon	nc	1	1	N	N	151	119	77
3	male	harpoon	nc	1	2	N	N	151	268	70
3	male	parquet	sc	1	1	Y	N	167	101	71
3	male	parquet	sc	1	2	Y	N	175	170	68
3	male	parquet	sc	1	1	Y	N	160	8	75
3	male	parquet	nc	1	1	N	N	167	160	73
3	male	parquet	nc	1	2	N	N	212	179	71
3	male	parquet	nc	1	1	N	N	147	121	67
3	male	parquet	nc	1	2	N	N	180	226	66
3	male	stockade	sc	1	1	N	N	175	136	73
3	male	stockade	sc	1	2	N	N	184	266	73
3	male	stockade	sc	1	1	N	N	167	287	71
3	male	stockade	sc	1	2	N	N	167	250	70
3	male	stockade	nc	1	1	N	N	172	146	74
3	male	stockade	nc	1	2	N	N	140	233	69
3	male	stockade	nc	1	1	Y	N	182	271	71
3	male	stockade	nc	1	2	Y	N	169	211	67
3	male	antique	sc	1	1	Y	N	179	170	64
3	male	antique	sc	1	2	Y	N	185	177	64
3	male	antique	sc	1	1	Y	N	167	189	63
3	male	antique	nc	1	2	Y	N	182	271	75
3	male	antique	nc	1	1	Y	N	149	170	72
3	male	antique	nc	1	2	Y	N	175	272	71
3	male	bamboo	sc	1	1	N	N	172	181	76
3	male	bamboo	sc	1	2	N	N	172	174	78
3	male	bamboo	sc	1	1	Y	N	145	204	66
3	male	bamboo	sc	1	2	Y	N	141	161	66
3	male	bamboo	nc	1	1	N	N	172	183	74
3	male	bamboo	nc	1	2	N	N	175	150	75
3	male	bamboo	nc	1	1	N	N	136	253	66
3	male	bamboo	nc	1	2	N	N	151	210	69
3	male	cascade	sc	1	1	N	N	172	244	75
3	male	cascade	sc	1	2	Y	N	166	213	65
3	male	cascade	nc	1	1	N	N	155	270	68
3	male	cascade	nc	1	2	N	N	190	190	67
3	male	cascade	nc	1	1	N	N	175	269	73
3	male	cascade	nc	1	2	N	N	172	278	69

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
3	male	tableau	sc	1	2	Y	N	175	269	75
3	male	tableau	sc	1	1	N	N	187	148	71
3	male	tableau	sc	1	2	N	N	162	199	73
3	male	tableau	nc	1	1	N	N	167	175	78
3	male	tableau	nc	1	2	N	N	172	291	78
3	male	tableau	nc	1	1	N	N	172	166	71
3	male	tableau	nc	1	2	N	N	172	231	72
3	male	impure	sc	1	2	Y	N	164	272	76
3	male	impure	sc	1	2	Y	N	154	263	67
3	male	impure	nc	1	1	N	N	155	164	74
3	male	impure	nc	1	1	N	N	160	156	70
3	male	impure	nc	1	2	N	N	151	257	72
3	male	inept	sc	1	1	N	N	141	58	57
3	male	inept	sc	1	2	N	N	155	188	62
3	male	inept	sc	1	1	N	N	121	161	61
3	male	inept	sc	1	2	N	N	141	315	73
3	male	inept	nc	1	1	N	N	134	55	67
3	male	inept	nc	1	2	N	N	155	198	72
3	male	inept	nc	1	2	Y	N	175	350	78
3	male	infirm	sc	1	2	Y	N	145	184	66
3	male	infirm	sc	1	1	N	N	151	99	67
3	male	infirm	sc	1	2	N	N	184	320	68
3	male	infirm	nc	1	2	N	N	190	276	69
3	male	infirm	nc	1	1	Y	N	140	133	66
3	male	infirm	nc	1	2	Y	N	151	298	69
3	male	thirteen	sc	1	2	Y	N	197	248	67
3	male	thirteen	sc	1	2	Y	N	166	223	62
3	male	thirteen	nc	1	1	N	N	172	111	74
3	male	thirteen	nc	1	2	N	N	184	262	72
3	male	thirteen	nc	1	2	Y	N	184	265	68
3	male	fourteen	sc	1	2	Y	N	185	285	66
3	male	fourteen	sc	1	1	Y	N	184	130	67
3	male	fourteen	sc	1	2	Y	N	193	217	66
3	male	fourteen	nc	1	1	Y	N	190	119	71
3	male	fourteen	nc	1	2	Y	N	187	269	68
3	male	fourteen	nc	1	2	Y	N	176	235	64
3	male	georgine	sc	1	1	N	N	167	163	76
3	male	georgine	sc	1	2	N	N	175	295	74
3	male	georgine	sc	1	1	N	N	136	152	69
3	male	georgine	sc	1	2	N	N	160	269	66
3	male	georgine	nc	1	1	Y	N	184	184	69
3	male	georgine	nc	1	1	N	N	153	151	72
3	male	georgine	nc	1	2	N	N	175	260	70
3	male	ornate	sc	1	1	Y	N	172	117	78
3	male	ornate	sc	1	2	Y	N	169	236	73
3	male	ornate	sc	1	1	N	N	145	168	71
3	male	ornate	sc	1	2	N	N	145	193	71
3	male	ornate	nc	1	1	N	N	136	105	70

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
3	male	ornate	nc	1	2	N	N	155	196	68
3	male	ornate	nc	1	1	N	N	131	106	65
3	male	ornate	nc	1	2	N	N	151	196	67
3	male	pauline'	sc	1	1	N	N	153	129	71
3	male	pauline'	sc	1	2	N	N	190	224	69
3	male	pauline'	sc	1	2	Y	N	178	238	66
3	male	pauline'	nc	1	1	N	N	151	163	73
3	male	pauline'	nc	1	2	N	N	190	294	72
3	male	pauline'	nc	1	1	N	N	153	210	74
3	male	pauline'	nc	1	2	N	N	160	277	70
3	male	U2	sc	1	2	Y	N	189	190	69
3	male	U2	sc	1	1	Y	N	154	93	70
3	male	U2	sc	1	2	Y	N	161	169	70
3	male	U2	nc	1	1	N	N	181	124	69
3	male	U2	nc	1	2	N	N	172	293	74
3	male	U2	nc	1	1	N	N	147	177	74
3	male	U2	nc	1	2	N	N	162	345	73
3	male	hotel	sc	1	1	N	N	187	117	72
3	male	hotel	sc	1	2	N	N	216	173	77
3	male	hotel	sc	1	1	Y	N	147	109	66
3	male	hotel	sc	1	2	Y	N	137	186	67
3	male	hotel	nc	1	1	N	N	151	143	73
3	male	hotel	nc	1	2	N	N	200	162	72
3	male	hotel	nc	1	1	N	N	155	117	70
3	male	hotel	nc	1	2	N	N	162	194	70
3	male	Jose	sc	1	1	Y	N	173	134	68
3	male	Jose	sc	1	2	Y	N	182	191	70
3	male	Jose	sc	1	1	Y	N	143	129	70
3	male	Jose	sc	1	2	Y	N	138	196	68
3	male	Jose	nc	1	1	N	N	142	105	70
3	male	Jose	nc	1	2	N	N	175	245	75
3	male	Jose	nc	1	1	N	N	162	128	72
3	male	Jose	nc	1	2	N	N	162	264	73
3	male	robust	sc	1	1	N	N	151	166	75
3	male	robust	sc	1	2	N	N	181	255	74
3	male	robust	sc	1	1	N	N	141	134	73
3	male	robust	nc	1	1	N	N	128	110	69
3	male	robust	nc	1	2	N	N	160	268	74
3	male	robust	nc	1	1	Y	N	167	206	74
3	male	robust	nc	1	2	Y	N	154	305	73
3	male	rosanne	sc	1	1	Y	N	181	154	70
3	male	rosanne	sc	1	2	Y	N	204	215	67
3	male	rosanne	sc	1	1	N	N	141	128	71
3	male	rosanne	sc	1	2	N	N	162	242	69
3	male	rosanne	nc	1	1	N	N	135	144	70
3	male	rosanne	nc	1	2	N	N	167	282	71
3	male	rosanne	nc	1	1	N	N	134	174	69
3	male	rosanne	nc	1	2	N	N	160	259	66

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
3	male	rotund	sc	1	1	Y	N	169	127	71
3	male	rotund	sc	1	2	Y	N	173	216	66
3	male	rotund	sc	1	2	Y	N	150	287	68
3	male	rotund	nc	1	1	N	N	136	176	69
3	male	rotund	nc	1	2	N	N	172	302	67
3	male	rotund	nc	1	1	N	N	151	163	68
3	male	rotund	nc	1	2	N	N	167	282	67
3	male	Chinese	sc	1	1	Y	N	176	197	69
3	male	Chinese	sc	1	2	Y	N	188	200	66
3	male	Chinese	sc	1	1	Y	N	182	292	70
3	male	Chinese	sc	1	2	Y	N	182	239	68
3	male	Chinese	nc	1	2	Y	N	189	220	68
3	male	Chinese	nc	1	1	Y	N	184	187	64
3	male	Chinese	nc	1	2	Y	N	189	217	64
4	female	preempt	sc	1	2	N	N	193	247	71
4	female	preempt	sc	1	1	N	N	181	229	67
4	female	preempt	sc	1	2	N	N	167	294	64
4	female	preempt	nc	1	1	Y	N	208	201	68
4	female	preempt	nc	1	2	Y	N	201	266	65
4	female	preempt	nc	1	2	N	N	172	311	68
4	female	cartoon	sc	1	2	Y	N	201	230	78
4	female	cartoon	sc	1	1	N	N	181	128	65
4	female	cartoon	sc	1	2	N	N	184	294	64
4	female	cartoon	nc	1	1	N	N	167	221	72
4	female	cartoon	nc	1	2	N	N	204	250	71
4	female	cartoon	nc	1	1	N	N	181	175	74
4	female	cartoon	nc	1	2	N	N	208	231	71
4	female	chartreuse	sc	1	2	Y	N	225	258	70
4	female	chartreuse	sc	1	1	N	N	167	269	69
4	female	chartreuse	sc	1	2	N	N	201	338	71
4	female	chartreuse	nc	1	1	N	N	153	210	72
4	female	chartreuse	nc	1	2	N	N	200	296	75
4	female	chartreuse	nc	1	1	N	N	155	290	73
4	female	chartreuse	nc	1	2	N	N	187	412	75
4	female	harpoon	sc	1	2	Y	N	225	265	67
4	female	harpoon	sc	1	1	Y	N	167	169	71
4	female	harpoon	sc	1	2	Y	N	167	317	67
4	female	harpoon	nc	1	2	Y	N	235	214	65
4	female	harpoon	nc	1	1	Y	N	170	137	62
4	female	harpoon	nc	1	2	Y	N	170	289	61
4	female	parquet	sc	1	2	N	N	225	174	64
4	female	parquet	sc	1	2	Y	N	181	176	59
4	female	parquet	nc	1	1	Y	N	216	147	73
4	female	parquet	nc	1	2	Y	N	208	231	68
4	female	parquet	nc	1	1	Y	N	193	168	76
4	female	parquet	nc	1	2	Y	N	201	263	72
4	female	blockade	sc	1	1	Y	N	172	183	65
4	female	blockade	sc	1	1	N	N	162	243	72

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
4	female	blockade	sc	1	2	N	N	160	329	70
4	female	blockade	nc	1	2	Y	N	201	243	62
4	female	blockade	nc	1	1	N	N	167	193	68
4	female	blockade	nc	1	2	N	N	200	374	69
4	female	pontoon	sc	1	2	N	N	245	295	74
4	female	pontoon	sc	1	1	Y	N	187	186	71
4	female	pontoon	sc	1	2	Y	N	196	309	66
4	female	pontoon	nc	1	2	Y	N	201	280	78
4	female	pontoon	nc	1	2	Y	N	204	307	64
4	female	stockade	sc	1	2	Y	N	225	175	65
4	female	stockade	sc	1	2	Y	N	167	249	60
4	female	stockade	nc	1	1	N	N	184	293	76
4	female	stockade	nc	1	2	N	N	208	301	73
4	female	stockade	nc	1	1	N	N	167	298	69
4	female	antique	sc	1	2	Y	N	256	192	69
4	female	antique	sc	1	2	Y	N	190	193	68
4	female	antique	nc	1	1	Y	N	178	166	64
4	female	antique	nc	1	2	N	N	193	216	68
4	female	bamboo	sc	1	2	Y	N	212	182	78
4	female	bamboo	sc	1	1	Y	N	175	232	65
4	female	bamboo	nc	1	2	N	N	190	212	74
4	female	bamboo	nc	1	2	Y	N	170	184	78
4	female	cafe	sc	1	2	N	N	183	306	72
4	female	cafe	sc	1	1	N	N	172	199	72
4	female	cafe	sc	1	2	N	N	190	314	73
4	female	cafe	nc	1	2	Y	N	208	380	69
4	female	cafe	nc	1	2	Y	N	175	185	75
4	female	campaign	sc	1	2	Y	N	208	366	69
4	female	campaign	sc	1	1	N	N	187	134	69
4	female	campaign	sc	1	2	N	N	190	287	66
4	female	campaign	nc	1	2	Y	N	204	257	69
4	female	campaign	nc	1	2	Y	N	190	210	74
4	female	canteen	sc	1	2	Y	N	201	275	61
4	female	canteen	sc	1	1	N	N	172	224	74
4	female	canteen	sc	1	2	N	N	172	306	73
4	female	canteen	nc	1	2	N	N	245	189	74
4	female	canteen	nc	1	1	N	N	181	224	70
4	female	canteen	nc	1	2	N	N	183	277	69
4	female	cascade	sc	1	2	Y	N	201	214	79
4	female	cascade	sc	1	1	Y	N	193	319	61
4	female	cascade	sc	1	2	Y	N	201	260	62
4	female	cascade	nc	1	2	Y	N	216	135	67
4	female	cascade	nc	1	1	N	N	135	335	61
4	female	cascade	nc	1	2	N	N	135	339	60
4	female	flambeau	sc	1	1	Y	N	190	293	74
4	female	flambeau	sc	1	1	Y	N	162	229	62
4	female	flambeau	sc	1	2	Y	N	160	140	63
4	female	flambeau	nc	1	1	N	N	172	230	71

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
4	female	flambeau	nc	1	2	N	N	181	182	75
4	female	flambeau	nc	1	2	N	N	164	169	72
4	female	taboo	sc	1	2	Y	N	201	201	69
4	female	taboo	sc	1	1	N	N	173	96	71
4	female	taboo	sc	1	2	N	N	181	195	72
4	female	taboo	nc	1	1	N	N	190	135	70
4	female	taboo	nc	1	2	N	N	193	111	72
4	female	taboo	nc	1	1	N	N	193	94	68
4	female	taboo	nc	1	2	N	N	172	115	69
4	female	tableau	sc	1	2	Y	N	193	160	63
4	female	tableau	sc	1	1	Y	N	187	238	71
4	female	tableau	sc	1	2	Y	N	181	197	69
4	female	tableau	nc	1	2	Y	N	172	221	81
4	female	tableau	nc	1	1	N	N	172	208	69
4	female	tableau	nc	1	2	N	N	167	283	70
4	female	impure	sc	1	2	Y	N	230	212	80
4	female	impure	sc	1	2	Y	N	181	228	78
4	female	impure	nc	1	2	N	N	225	340	76
4	female	impure	nc	1	1	Y	N	167	183	76
4	female	impure	nc	1	2	Y	N	181	293	77
4	female	infirm	sc	1	1	N	N	167	108	64
4	female	infirm	sc	1	2	N	N	204	258	73
4	female	infirm	sc	1	2	Y	N	191	236	64
4	female	infirm	nc	1	1	N	N	187	158	69
4	female	infirm	nc	1	2	N	N	216	463	69
4	female	infirm	nc	1	1	N	N	167	89	68
4	female	infirm	nc	1	2	N	N	172	354	69
4	female	festoon	sc	1	2	Y	N	201	271	72
4	female	festoon	sc	1	1	N	N	181	191	67
4	female	festoon	sc	1	2	N	N	172	286	69
4	female	festoon	nc	1	2	Y	N	225	189	76
4	female	festoon	nc	1	2	Y	N	172	241	68
4	female	thirteen	sc	1	2	Y	N	201	261	62
4	female	thirteen	sc	1	1	Y	N	193	156	72
4	female	thirteen	sc	1	2	Y	N	200	289	70
4	female	thirteen	nc	1	2	Y	N	208	422	69
4	female	thirteen	nc	1	2	N	N	190	321	69
4	female	fourteen	sc	1	1	Y	N	190	164	78
4	female	fourteen	sc	1	2	Y	N	186	218	60
4	female	fourteen	nc	1	2	Y	N	225	203	63
4	female	fourteen	nc	1	1	N	N	184	155	67
4	female	fourteen	nc	1	2	N	N	212	281	67
4	female	georgine	sc	1	1	N	N	172	163	73
4	female	georgine	sc	1	2	N	N	187	347	72
4	female	georgine	sc	1	2	Y	N	162	331	65
4	female	georgine	nc	1	1	N	N	167	149	72
4	female	georgine	nc	1	2	N	N	175	314	73
4	female	georgine	nc	1	1	N	N	167	192	71

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
4	female	georgine	nc	1	2	N	N	167	325	69
4	female	ordeal	sc	1	2	Y	N	204	201	68
4	female	ordeal	sc	1	2	Y	N	172	237	79
4	female	ordeal	nc	1	2	Y	N	181	231	71
4	female	ordeal	nc	1	1	N	N	160	179	75
4	female	ordeal	nc	1	2	N	N	167	332	76
4	female	ornate	sc	1	2	Y	N	193	154	69
4	female	ornate	sc	1	2	Y	N	162	316	75
4	female	ornate	nc	1	1	N	N	155	86	68
4	female	ornate	nc	1	2	N	N	167	373	72
4	female	ornate	nc	1	1	N	N	160	142	68
4	female	ornate	nc	1	2	N	N	162	290	70
4	female	pauline'	sc	1	2	N	N	201	213	72
4	female	pauline'	sc	1	1	Y	N	208	167	72
4	female	pauline'	sc	1	2	Y	N	181	246	66
4	female	pauline'	nc	1	1	N	N	172	152	74
4	female	pauline'	nc	1	2	N	N	184	241	72
4	female	pauline'	nc	1	1	N	N	186	249	72
4	female	pauline'	nc	1	2	N	N	184	407	70
4	female	crusade	sc	1	2	Y	N	212	383	82
4	female	crusade	sc	1	1	N	N	172	70	66
4	female	crusade	sc	1	2	N	N	175	292	71
4	female	crusade	nc	1	2	Y	N	178	201	64
4	female	crusade	nc	1	1	N	N	187	192	51
4	female	crusade	nc	1	2	N	N	173	293	71
4	female	U2	sc	1	1	Y	N	204	141	64
4	female	U2	sc	1	2	Y	N	235	145	62
4	female	U2	sc	1	1	Y	N	181	120	77
4	female	U2	sc	1	2	Y	N	172	219	79
4	female	U2	nc	1	2	Y	N	225	189	64
4	female	U2	nc	1	1	N	N	167	261	70
4	female	U2	nc	1	2	N	N	190	228	72
4	female	UN	sc	1	1	N	N	167	180	73
4	female	UN	sc	1	2	N	N	187	219	71
4	female	UN	sc	1	2	Y	N	181	211	64
4	female	UN	nc	1	2	Y	N	201	119	62
4	female	UN	nc	1	2	Y	N	170	179	61
4	female	cocaine	sc	1	1	N	N	193	107	68
4	female	cocaine	sc	1	2	N	N	212	279	69
4	female	cocaine	sc	1	1	N	N	190	74	69
4	female	cocaine	sc	1	2	N	N	201	315	69
4	female	cocaine	nc	1	1	Y	N	208	53	64
4	female	cocaine	nc	1	2	Y	N	225	225	63
4	female	cocaine	nc	1	1	N	N	181	93	65
4	female	cocaine	nc	1	2	N	N	190	271	67
4	female	hotel	sc	1	2	Y	N	187	165	60
4	female	hotel	sc	1	1	N	N	181	88	71
4	female	hotel	sc	1	2	N	N	186	214	71

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
4	female	hotel	nc	1	2	Y	N	200	215	71
4	female	hotel	nc	1	1	N	N	155	121	69
4	female	hotel	nc	1	2	N	N	175	207	69
4	female	Jose	sc	1	1	N	N	208	123	66
4	female	Jose	sc	1	2	N	N	204	209	68
4	female	Jose	sc	1	2	Y	N	167	181	63
4	female	Jose	nc	1	1	N	N	167	200	65
4	female	Jose	nc	1	2	N	N	190	269	68
4	female	Jose	nc	1	1	N	N	175	191	71
4	female	Jose	nc	1	2	N	N	167	218	72
4	female	overt	sc	1	2	Y	N	204	235	67
4	female	overt	sc	1	1	N	N	147	100	68
4	female	overt	sc	1	2	N	N	162	214	70
4	female	overt	nc	1	2	Y	N	201	153	65
4	female	overt	nc	1	1	N	N	162	114	71
4	female	overt	nc	1	2	N	N	153	207	72
4	female	robust	sc	1	1	Y	N	175	148	71
4	female	robust	sc	1	1	N	N	162	160	70
4	female	robust	sc	1	2	N	N	167	354	72
4	female	robust	nc	1	2	Y	N	201	252	68
4	female	robust	nc	1	1	N	N	146	134	69
4	female	robust	nc	1	2	N	N	167	376	74
4	female	rosanne	sc	1	1	Y	N	181	244	66
4	female	rosanne	sc	1	1	N	N	190	175	66
4	female	rosanne	sc	1	2	N	N	184	245	65
4	female	rosanne	nc	1	1	N	N	153	133	71
4	female	rosanne	nc	1	2	N	N	162	215	70
4	female	rosanne	nc	1	1	N	N	167	166	70
4	female	rosanne	nc	1	2	N	N	160	300	68
1	female	cartoon	sc	1	2	Y	Y	172	311	67
1	female	chartreuse	sc	1	1	Y	Y	190	243	67
1	female	chartreuse	nc	1	2	N	Y	187	334	70
1	female	harpoon	sc	1	2	N	Y	212	325	72
1	female	harpoon	nc	1	1	Y	Y	204	262	66
1	female	parquet	sc	1	1	Y	Y	190	171	62
1	female	parquet	sc	1	1	Y	Y	190	166	72
1	female	blockade	sc	1	2	N	Y	193	328	70
1	female	blockade	sc	1	1	Y	Y	160	218	60
1	female	stockade	sc	1	2	N	Y	204	208	74
1	female	stockade	nc	1	2	N	Y	204	265	74
1	female	antique	sc	1	1	Y	Y	190	201	66
1	female	antique	sc	1	1	Y	Y	197	133	58
1	female	antique	nc	1	2	Y	Y	189	187	65
1	female	antique	nc	1	1	Y	Y	167	131	57
1	female	ballet	sc	1	1	Y	Y	160	250	69
1	female	ballet	sc	1	1	Y	Y	162	198	65
1	female	bamboo	sc	1	2	Y	Y	193	123	61
1	female	cafe	sc	1	2	N	Y	183	272	67

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
1	female	cafe	nc	1	2	N	Y	172	281	74
1	female	canteen	sc	1	2	N	Y	190	325	63
1	female	cascade	sc	1	1	Y	Y	184	253	66
1	female	flambeau	sc	1	1	Y	Y	181	294	68
1	female	flambeau	sc	1	1	Y	Y	189	305	65
1	female	taboo	sc	1	2	N	Y	183	151	74
1	female	taboo	nc	1	2	Y	Y	204	137	65
1	female	impure	sc	1	1	Y	Y	212	160	70
1	female	impure	sc	1	1	Y	Y	172	140	66
1	female	impure	nc	1	2	N	Y	212	245	73
1	female	impure	nc	1	1	Y	Y	187	211	63
1	female	inept	sc	1	2	N	Y	167	211	73
1	female	inept	sc	1	1	Y	Y	172	175	65
1	female	inept	nc	1	1	Y	Y	172	228	65
1	female	thirteen	sc	1	1	Y	Y	208	145	63
1	female	thirteen	sc	1	1	Y	Y	193	231	63
1	female	fourteen	sc	1	1	Y	Y	212	159	75
1	female	fourteen	sc	1	1	Y	Y	204	171	70
1	female	fourteen	nc	1	1	Y	Y	216	233	73
1	female	fourteen	nc	1	1	Y	Y	200	120	64
1	female	Maurice	sc	1	2	N	Y	212	299	74
1	female	Maurice	nc	1	2	N	Y	167	230	71
1	female	ornate	sc	1	2	N	Y	184	207	71
1	female	ornate	sc	1	1	Y	Y	172	171	68
1	female	ornate	nc	1	1	Y	Y	175	122	67
1	female	duet	sc	1	2	N	Y	190	218	76
1	female	duet	sc	1	1	Y	Y	187	159	68
1	female	duet	nc	1	2	N	Y	172	208	70
1	female	crusade	sc	1	2	N	Y	212	336	77
1	female	U2	sc	1	1	Y	Y	201	176	63
1	female	U2	sc	1	1	Y	Y	200	192	61
1	female	U2	nc	1	2	N	Y	193	248	72
1	female	UN	sc	1	1	Y	Y	200	137	69
1	female	UN	sc	1	1	Y	Y	172	179	63
1	female	UN	nc	1	2	N	Y	201	233	73
1	female	hotel	sc	1	2	N	Y	190	218	64
1	female	hotel	nc	1	2	N	Y	187	233	63
1	female	Jose	sc	1	2	N	Y	187	278	75
1	female	Jose	nc	1	1	Y	Y	172	215	69
1	female	profane	sc	1	2	N	Y	187	366	75
1	female	profane	sc	1	1	Y	Y	181	152	59
1	female	profane	nc	1	1	Y	Y	184	192	67
1	female	robust	sc	1	1	Y	Y	187	170	69
1	female	robust	sc	1	1	Y	Y	181	133	64
1	female	robust	nc	1	1	Y	Y	201	219	59
1	female	rotund	sc	1	2	N	Y	187	263	69
1	female	rotund	sc	1	1	Y	Y	175	171	70
1	female	rotund	nc	1	1	Y	Y	197	169	69

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
1	female	rotund	nc	1	1	Y	Y	172	212	71
1	female	Chinese	sc	1	1	Y	Y	201	220	60
1	female	Chinese	sc	1	1	Y	Y	193	282	67
1	female	Chinese	nc	1	1	Y	Y	193	229	66
2	female	preempt	sc	1	1	Y	Y	204	220	72
2	female	rebuild	nc	1	1	Y	Y	201	176	69
2	female	parquet	sc	1	2	Y	Y	190	133	66
2	female	parquet	sc	1	1	Y	Y	170	81	63
2	female	blockade	sc	1	2	N	Y	190	355	69
2	female	blockade	sc	1	1	Y	Y	175	183	72
2	female	pontoon	nc	1	1	Y	Y	225	271	71
2	female	pontoon	nc	1	1	Y	Y	216	239	69
2	female	antique	sc	1	2	Y	Y	245	222	70
2	female	antique	sc	1	2	Y	Y	187	223	69
2	female	antique	nc	1	1	Y	Y	208	231	74
2	female	antique	nc	1	1	Y	Y	153	212	75
2	female	ballet	sc	1	1	Y	Y	190	216	68
2	female	ballet	sc	i	1	Y	Y	160	231	71
2	female	cafe	sc	1	2	Y	Y	190	216	68
2	female	campaign	sc	1	2	Y	Y	240	227	70
2	female	cascade	sc	1	1	Y	Y	212	303	70
2	female	cascade	nc	1	1	Y	Y	201	349	71
2	female	flambeau	sc	1	1	Y	Y	190	244	68
2	female	impure	sc	1	1	Y	Y	240	140	75
2	female	impure	sc	1	1	Y	Y	201	175	71
2	female	impure	nc	1	1	Y	Y	221	165	75
2	female	infirm	sc	1	1	Y	Y	245	200	76
2	female	infirm	nc	1	1	Y	Y	263	191	71
2	female	technique	sc	1	1	Y	Y	212	191	67
2	female	thirteen	sc	1	1	Y	Y	216	136	71
2	female	fourteen	sc	1	1	Y	Y	256	148	72
2	female	fourteen	sc	1	1	Y	Y	167	152	63
2	female	fourteen	nc	1	1	Y	Y	212	145	66
2	female	fourteen	nc	1	2	Y	Y	225	223	64
2	female	georgett	nc	1	1	N	Y	193	170	74
2	female	georgine	sc	1	2	Y	Y	225	293	66
2	female	ornate	sc	1	1	Y	Y	172	172	79
2	female	ornate	nc	1	1	Y	Y	190	149	72
2	female	U2	sc	1	1	Y	Y	212	174	68
2	female	U2	nc	1	1	Y	Y	245	166	73
2	female	UN	sc	1	2	Y	Y	212	220	66
2	female	UN	nc	1	1	Y	Y	193	148	66
2	female	UN	nc	1	1	Y	Y	160	185	71
2	female	cocaine	sc	1	1	Y	Y	216	124	72
2	female	hotel	sc	1	1	Y	Y	217	135	74
2	female	overt	sc	1	1	Y	Y	204	176	70
2	female	overt	nc	1	1	Y	Y	181	154	65
2	female	rosanne	sc	1	1	Y	Y	225	189	77

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
2	female	rotund	sc	1	1	Y	Y	225	173	74
2	female	Chinese	sc	1	2	Y	Y	184	184	60
2	female	Chinese	nc	1	2	N	Y	225	180	75
3	male	preempt	nc	1	1	Y	Y	196	103	69
3	male	rebuild	sc	1	1	Y	Y	170	136	66
3	male	chartreuse	sc	1	1	Y	Y	170	266	68
3	male	harpoon	sc	1	2	Y	Y	212	239	68
3	male	harpoon	nc	1	1	Y	Y	190	76	72
3	male	parquet	sc	1	2	Y	Y	167	170	69
3	male	antique	sc	1	2	Y	Y	172	202	65
3	male	antique	nc	1	1	Y	Y	172	154	76
3	male	cascade	sc	1	2	N	Y	175	191	72
3	male	cascade	sc	1	1	Y	Y	172	274	69
3	male	tableau	sc	1	1	Y	Y	181	181	75
3	male	impure	sc	1	1	Y	Y	167	143	73
3	male	impure	sc	1	1	Y	Y	162	146	65
3	male	impure	nc	1	2	N	Y	175	276	75
3	male	inept	nc	1	1	Y	Y	187	122	80
3	male	infirm	sc	1	1	Y	Y	179	152	66
3	male	infirm	nc	1	1	N	Y	175	135	69
3	male	thirteen	sc	1	1	Y	Y	204	102	70
3	male	thirteen	sc	1	1	Y	Y	169	116	66
3	male	thirteen	nc	1	1	Y	Y	186	121	72
3	male	fourteen	sc	1	1	Y	Y	188	94	70
3	male	fourteen	nc	1	1	Y	Y	186	90	67
3	male	georgine	nc	1	2	Y	Y	193	247	63
3	male	pauline'	sc	1	1	Y	Y	175	127	70
3	male	U2	sc	1	1	Y	Y	188	174	69
3	male	robust	sc	1	2	N	Y	167	260	76
3	male	rotund	sc	1	1	Y	Y	156	141	73
3	male	Chinese	nc	1	1	Y	Y	191	184	70
4	female	preempt	sc	1	1	N	Y	193	216	70
4	female	preempt	nc	1	1	N	Y	181	120	71
4	female	cartoon	sc	1	1	Y	Y	193	202	82
4	female	chartreuse	sc	1	1	Y	Y	172	238	73
4	female	harpoon	sc	1	1	Y	Y	208	118	73
4	female	harpoon	nc	1	1	Y	Y	187	202	67
4	female	parquet	sc	1	1	N	Y	200	168	68
4	female	parquet	sc	1	1	Y	Y	187	139	62
4	female	blockade	sc	1	2	Y	Y	204	196	54
4	female	blockade	nc	1	1	Y	Y	175	205	67
4	female	pontoon	sc	1	1	N	Y	200	209	75
4	female	pontoon	nc	1	1	Y	Y	201	256	80
4	female	pontoon	nc	1	1	Y	Y	197	257	68
4	female	stockade	sc	1	1	Y	Y	204	129	68
4	female	stockade	sc	1	1	Y	Y	167	143	65
4	female	stockade	nc	1	2	N	Y	167	323	68
4	female	antique	sc	1	1	Y	Y	200	165	69

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
4	female	antique	sc	1	1	Y	Y	193	221	68
4	female	antique	nc	1	2	Y	Y	251	146	64
4	female	antique	nc	1	1	N	Y	160	126	66
4	female	bamboo	sc	1	1	Y	Y	193	220	78
4	female	bamboo	sc	1	2	Y	Y	172	46	60
4	female	bamboo	nc	1	1	N	Y	167	161	71
4	female	bamboo	nc	1	1	Y	Y	208	293	80
4	female	cafe	sc	1	1	N	Y	172	214	71
4	female	cafe	nc	1	1	Y	Y	204	193	69
4	female	cafe	nc	1	1	Y	Y	190	224	76
4	female	campaign	sc	1	1	Y	Y	201	258	71
4	female	campaign	nc	1	1	Y	Y	212	230	70
4	female	campaign	nc	1	1	Y	Y	225	247	80
4	female	canteen	sc	1	1	Y	Y	216	172	62
4	female	canteen	nc	1	1	N	Y	187	131	69
4	female	cascade	sc	1	1	Y	Y	190	286	80
4	female	cascade	nc	1	1	Y	Y	225	291	66
4	female	flambeau	sc	1	2	Y	Y	212	162	75
4	female	flambeau	nc	1	1	N	Y	162	265	68
4	female	taboo	sc	1	1	Y	Y	201	221	70
4	female	tableau	sc	1	1	Y	Y	201	192	64
4	female	tableau	nc	1	1	Y	Y	208	250	80
4	female	impure	sc	1	1	Y	Y	235	149	79
4	female	impure	sc	1	1	Y	Y	184	159	78
4	female	impure	nc	1	1	N	Y	190	122	74
4	female	infirm	sc	1	1	Y	Y	201	192	63
4	female	festoon	sc	1	1	Y	Y	190	227	77
4	female	festoon	nc	1	1	Y	Y	212	172	78
4	female	festoon	nc	1	1	Y	Y	193	157	64
4	female	thirteen	sc	1	1	Y	Y	175	119	63
4	female	thirteen	nc	1	1	Y	Y	201	137	71
4	female	thirteen	nc	1	1	N	Y	190	133	71
4	female	fourteen	sc	1	2	Y	Y	212	250	78
4	female	fourteen	sc	1	1	Y	Y	190	142	64
4	female	fourteen	nc	1	1	Y	Y	201	129	66
4	female	georgine	sc	1	1	Y	Y	181	207	66
4	female	ordeal	sc	1	1	Y	Y	221	219	68
4	female	ordeal	sc	1	1	Y	Y	172	279	80
4	female	ordeal	nc	1	1	Y	Y	181	193	72
4	female	ornate	sc	1	1	Y	Y	187	148	68
4	female	ornate	sc	1	1	Y	Y	172	177	77
4	female	pauline'	sc	1	1	N	Y	181	175	76
4	female	crusade	sc	1	1	Y	Y	275	66	80
4	female	crusade	nc	1	1	Y	Y	225	99	63
4	female	U2	nc	1	1	Y	Y	240	225	65
4	female	UN	sc	1	1	Y	Y	181	229	64
4	female	UN	nc	1	1	Y	Y	190	179	61
4	female	UN	nc	1	1	Y	Y	175	180	63

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
4	female	hotel	sc	1	1	Y	Y	201	165	63
4	female	hotel	nc	1	1	Y	Y	187	144	72
4	female	Jose	sc	1	1	Y	Y	178	168	62
4	female	overt	sc	1	1	Y	Y	208	146	67
4	female	overt	nc	1	1	Y	Y	181	132	68
4	female	robust	sc	1	2	Y	Y	190	333	72
4	female	robust	nc	1	1	Y	Y	187	136	69
4	female	rosanne	sc	1	2	Y	Y	204	225	65
4	female	Chinese	sc	2	2	Y	N	190	214	76
4	female	Chinese	sc	2	2	Y	N	187	184	61
4	female	Chinese	nc	2	2	Y	N	190	208	68
4	female	Chinese	nc	2	2	Y	N	175	219	59
5	male	rebuild	sc	2	1	Y	N	102	166	65
5	male	rebuild	sc	2	2	Y	N	110	213	66
5	male	rebuild	sc	2	1	Y	N	121	190	73
5	male	rebuild	sc	2	2	Y	N	109	250	71
5	male	rebuild	nc	2	2	N	N	141	197	76
5	male	rebuild	nc	2	1	N	N	104	244	65
5	male	rebuild	nc	2	2	N	N	93	248	65
5	male	ballet	sc	2	1	N	N	105	213	66
5	male	ballet	sc	2	2	N	N	117	230	66
5	male	ballet	sc	2	1	Y	N	99	219	65
5	male	ballet	nc	2	2	Y	N	95	177	65
5	male	ballet	nc	2	1	N	N	98	224	66
5	male	ballet	nc	2	2	N	N	106	289	69
5	male	ballet	nc	2	1	N	N	98	215	71
5	male	ballet	sc	2	2	N	N	93	266	70
5	male	cafe	sc	2	2	Y	N	128	227	68
5	male	cafe	sc	2	1	N	N	98	174	65
5	male	cafe	sc	2	2	N	N	107	339	65
5	male	cafe	nc	2	1	N	N	101	175	71
5	male	cafe	nc	2	2	N	N	107	312	73
5	male	cafe	nc	2	1	N	N	106	183	65
5	male	cafe	nc	2	2	N	N	107	301	65
5	male	canteen	sc	2	1	N	N	120	183	64
5	male	canteen	sc	2	2	N	N	141	274	68
5	male	canteen	sc	2	1	Y	N	103	280	67
5	male	canteen	sc	2	2	Y	N	121	300	68
5	male	canteen	nc	2	1	N	N	115	160	66
5	male	canteen	nc	2	2	N	N	128	272	68
5	male	canteen	nc	2	1	N	N	94	121	60
5	male	canteen	nc	2	2	N	N	93	272	59
5	male	impure	sc	2	1	Y	N	131	193	65
5	male	impure	sc	2	2	Y	N	125	229	66
5	male	impure	sc	2	1	Y	N	110	121	62
5	male	impure	sc	2	2	Y	N	107	237	61
5	male	impure	nc	2	1	N	N	105	169	65
5	male	impure	nc	2	2	N	N	114	314	70

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
5	male	impure	nc	2	1	N	N	99	128	61
5	male	impure	nc	2	2	N	N	105	289	65
5	male	infirm	sc	2	1	N	N	91	96	60
5	male	infirm	sc	2	2	N	N	134	305	69
5	male	infirm	sc	2	1	N	N	101	95	69
5	male	infirm	sc	2	2	N	N	117	299	74
5	male	infirm	nc	2	2	Y	N	131	293	67
5	male	infirm	nc	2	1	N	N	98	80	62
5	male	infirm	nc	2	2	N	N	105	318	64
5	male	festoon	sc	2	1	Y	N	126	187	73
5	male	festoon	sc	2	2	Y	N	153	237	71
5	male	festoon	sc	2	1	N	N	98	234	64
5	male	festoon	sc	2	2	N	N	100	289	60
5	male	festoon	nc	2	1	N	N	120	182	70
5	male	festoon	nc	2	2	N	N	128	253	70
5	male	festoon	nc	2	1	N	N	108	270	66
5	male	festoon	nc	2	2	N	N	107	245	67
5	male	thirteen	sc	2	2	Y	N	128	257	69
5	male	thirteen	sc	2	2	Y	N	115	195	65
5	male	thirteen	nc	2	2	Y	N	110	251	65
5	male	thirteen	nc	2	2	Y	N	104	266	66
5	male	fourteen	sc	2	2	Y	N	131	278	65
5	male	fourteen	sc	2	1	Y	N	128	116	72
5	male	fourteen	sc	2	2	Y	N	128	202	71
5	male	fourteen	nc	2	1	Y	N	140	102	73
5	male	fourteen	nc	2	2	Y	N	135	251	71
5	male	fourteen	nc	2	2	Y	N	141	279	65
5	male	ornate	sc	2	1	N	N	102	102	64
5	male	ornate	sc	2	2	N	N	121	193	68
5	male	ornate	sc	2	1	Y	N	115	172	71
5	male	ornate	sc	2	2	Y	N	103	233	67
5	male	ornate	nc	2	1	N	N	90	143	62
5	male	ornate	nc	2	2	N	N	101	176	65
5	male	ornate	nc	2	1	N	N	97	155	70
5	male	ornate	nc	2	2	N	N	110	196	72
5	male	U2	sc	2	2	N	N	141	241	72
5	male	U2	sc	2	2	Y	N	116	190	68
5	male	U2	nc	2	1	N	N	135	150	77
5	male	U2	nc	2	2	N	N	143	233	76
5	male	U2	nc	2	1	N	N	102	138	70
5	male	U2	nc	2	2	N	N	114	390	75
5	male	UN	sc	2	1	Y	N	121	144	72
5	male	UN	sc	2	2	Y	N	116	197	71
5	male	UN	sc	2	1	Y	N	94	207	68
5	male	UN	sc	2	2	Y	N	93	215	67
5	male	UN	nc	2	2	N	N	126	135	68
5	male	UN	nc	2	1	N	N	88	145	63
5	male	UN	nc	2	2	N	N	90	204	64

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
5	male	robust	sc	2	2	Y	N	121	211	74
5	male	robust	sc	2	1	N	N	102	82	63
5	male	robust	sc	2	2	N	N	172	301	68
5	male	robust	nc	2	1	N	N	102	122	65
5	male	robust	nc	2	2	N	N	111	265	69
5	male	robust	nc	2	1	N	N	111	108	60
5	male	robust	nc	2	2	N	N	115	364	65
5	male	Chinese	sc	2	1	N	N	116	220	72
5	male	Chinese	sc	2	1	Y	N	104	233	64
5	male	Chinese	sc	2	2	Y	N	88	197	64
5	male	Chinese	nc	2	1	Y	N	134	190	68
5	male	Chinese	nc	2	2	Y	N	125	183	70
5	male	Chinese	nc	2	1	N	N	100	239	64
5	male	Chinese	nc	2	2	N	N	97	251	63
6	male	harpoon	sc	2	1	N	N	101	323	74
6	male	harpoon	sc	2	2	N	N	124	307	75
6	male	harpoon	sc	2	1	Y	N	100	232	71
6	male	harpoon	sc	2	2	Y	N	100	284	65
6	male	harpoon	nc	2	1	N	N	101	173	75
6	male	harpoon	nc	2	2	N	N	128	314	76
6	male	harpoon	nc	2	1	N	N	98	265	72
6	male	harpoon	nc	2	2	N	N	99	376	66
6	male	parquet	sc	2	1	Y	N	114	226	81
6	male	parquet	sc	2	2	Y	N	106	219	78
6	male	parquet	sc	2	1	N	N	98	186	74
6	male	parquet	sc	2	2	N	N	104	212	70
6	male	parquet	nc	2	1	Y	N	108	173	72
6	male	parquet	nc	2	2	Y	N	117	205	71
6	male	parquet	nc	2	1	N	N	102	273	75
6	male	parquet	nc	2	2	N	N	105	356	71
6	male	blockade	sc	2	1	Y	N	107	169	75
6	male	blockade	sc	2	2	Y	N	107	310	75
6	male	blockade	sc	2	1	N	N	100	205	76
6	male	blockade	sc	2	2	N	N	97	272	73
6	male	blockade	nc	2	1	N	N	101	191	69
6	male	blockade	nc	2	2	N	N	102	288	74
6	male	blockade	nc	2	1	N	N	94	185	73
6	male	blockade	nc	2	2	N	N	101	299	73
6	male	pontoon	sc	2	1	Y	N	101	222	70
6	male	pontoon	sc	2	2	Y	N	114	284	70
6	male	pontoon	sc	2	2	Y	N	102	312	67
6	male	pontoon	nc	2	1	N	N	102	156	73
6	male	pontoon	nc	2	2	N	N	115	326	73
6	male	pontoon	nc	2	1	N	N	104	239	72
6	male	pontoon	nc	2	2	N	N	109	344	73
6	male	stockade	sc	2	1	Y	N	116	299	70
6	male	stockade	sc	2	2	Y	N	107	256	70
6	male	stockade	sc	2	1	N	N	97	330	74

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
6	male	stockade	sc	2	2	N	N	99	286	75
6	male	stockade	nc	2	1	N	N	116	340	76
6	male	stockade	nc	2	2	N	N	116	366	75
6	male	stockade	nc	2	1	N	N	93	316	72
6	male	stockade	nc	2	2	N	N	98	307	68
6	male	bayonne	sc	2	1	Y	N	106	194	68
6	male	bayonne	sc	2	2	Y	N	102	226	67
6	male	bayonne	sc	2	1	N	N	97	182	75
6	male	bayonne	sc	2	2	N	N	97	274	73
6	male	bayonne	nc	2	1	N	N	150	171	78
6	male	bayonne	nc	2	2	N	N	128	298	74
6	male	bayonne	nc	2	1	N	N	93	194	71
6	male	bayonne	nc	2	2	N	N	97	342	70
6	male	antique	sc	2	1	Y	N	120	240	69
6	male	antique	sc	2	2	Y	N	121	207	70
6	male	antique	sc	2	1	Y	N	110	229	65
6	male	antique	sc	2	2	Y	N	98	205	67
6	male	antique	nc	2	1	N	N	106	244	71
6	male	antique	nc	2	2	N	N	108	125	71
6	male	antique	nc	2	2	Y	N	106	173	64
6	male	ballet	sc	2	1	N	N	111	178	67
6	male	ballet	sc	2	2	N	N	111	309	73
6	male	ballet	nc	2	2	Y	N	99	173	68
6	male	ballet	nc	2	1	N	N	117	208	73
6	male	ballet	nc	2	2	N	N	115	358	75
6	male	ballet	nc	2	1	N	N	97	223	72
6	male	ballet	sc	2	2	N	N	100	209	72
6	male	campaign	sc	2	2	Y	N	106	289	67
6	male	campaign	sc	2	1	N	N	93	259	70
6	male	campaign	sc	2	2	N	N	98	330	66
6	male	campaign	nc	2	1	Y	N	111	268	77
6	male	campaign	nc	2	1	N	N	97	264	71
6	male	campaign	nc	2	2	N	N	100	358	72
6	male	cascade	sc	2	1	N	N	121	314	76
6	male	cascade	sc	2	2	N	N	121	266	76
6	male	cascade	sc	2	1	Y	N	208	352	70
6	male	cascade	sc	2	2	Y	N	114	295	71
6	male	cascade	nc	2	2	Y	N	108	194	78
6	male	cascade	nc	2	1	N	N	106	376	75
6	male	cascade	nc	2	2	N	N	106	351	75
6	male	flambeau	sc	2	1	Y	N	106	380	75
6	male	flambeau	sc	2	2	Y	N	102	191	76
6	male	flambeau	sc	2	1	Y	N	110	348	68
6	male	flambeau	sc	2	2	Y	N	91	183	71
6	male	flambeau	nc	2	1	N	N	102	274	70
6	male	flambeau	nc	2	2	N	N	114	205	75
6	male	flambeau	nc	2	1	N	N	99	303	74
6	male	flambeau	nc	2	2	N	N	94	422	76

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
6	male	taboo	sc	2	1	N	N	98	154	75
6	male	taboo	sc	2	2	N	N	115	181	74
6	male	taboo	sc	2	1	Y	N	95	171	74
6	male	taboo	sc	2	2	Y	N	93	246	72
6	male	taboo	nc	2	1	N	N	100	151	76
6	male	taboo	nc	2	2	N	N	126	154	79
6	male	taboo	nc	2	1	N	N	106	173	73
6	male	taboo	nc	2	2	N	N	110	156	74
6	male	impure	sc	2	1	Y	N	111	147	73
6	male	impure	sc	2	2	Y	N	11	308	75
6	male	impure	sc	2	2	Y	N	101	319	73
6	male	impure	nc	2	1	Y	N	131	156	78
6	male	impure	nc	2	1	N	N	121	128	71
6	male	impure	nc	2	2	N	N	111	348	72
6	male	inept	sc	2	2	Y	N	124	131	70
6	male	inept	sc	2	1	N	N	86	105	70
6	male	inept	sc	2	2	N	N	98	332	73
6	male	inept	nc	2	1	N	N	100	129	70
6	male	inept	nc	2	1	N	N	86	109	66
6	male	inept	nc	2	2	N	N	90	120	70
6	male	infirm	sc	2	1	N	N	106	85	70
6	male	infirm	sc	2	2	N	N	129	463	71
6	male	infirm	sc	2	1	Y	N	147	206	66
6	male	infirm	sc	2	2	Y	N	120	407	67
6	male	infirm	nc	2	1	N	N	98	156	68
6	male	infirm	nc	2	2	N	N	111	337	71
6	male	infirm	nc	2	2	Y	N	110	436	75
6	male	festoon	sc	2	1	Y	N	116	338	79
6	male	festoon	sc	2	2	Y	N	116	340	78
6	male	festoon	sc	2	1	N	N	99	337	72
6	male	festoon	sc	2	2	N	N	100	304	68
6	male	festoon	nc	2	1	N	N	97	245	74
6	male	festoon	nc	2	2	N	N	129	304	75
6	male	festoon	nc	2	1	N	N	98	276	73
6	male	festoon	nc	2	2	N	N	111	282	73
6	male	technique	sc	2	2	Y	N	124	169	70
6	male	technique	sc	2	1	N	N	104	136	75
6	male	technique	sc	2	2	N	N	112	198	75
6	male	technique	nc	2	1	N	N	120	149	72
6	male	technique	nc	2	2	N	N	120	262	73
6	male	technique	nc	2	1	N	N	110	153	71
6	male	thirteen	sc	2	2	Y	N	120	284	66
6	male	thirteen	sc	2	1	Y	N	103	151	80
6	male	thirteen	nc	2	1	N	N	110	241	75
6	male	thirteen	nc	2	2	N	N	117	314	70
6	male	thirteen	nc	2	1	N	N	105	165	77
6	male	thirteen	nc	2	2	N	N	114	418	71
6	male	fourteen	sc	2	2	Y	N	120	333	70

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
6	male	fourteen	sc	2	2	Y	N	101	276	77
6	male	fourteen	nc	2	1	Y	N	124	284	71
6	male	fourteen	nc	2	2	Y	N	115	298	69
6	male	fourteen	nc	2	2	Y	N	103	272	76
6	male	ornate	sc	2	1	Y	N	124	132	74
6	male	ornate	sc	2	2	Y	N	108	181	73
6	male	ornate	sc	2	2	Y	N	100	226	77
6	male	ornate	nc	2	2	Y	N	111	146	66
6	male	ornate	nc	2	2	Y	N	103	362	75
6	male	pauline'	sc	2	1	Y	N	108	310	80
6	male	pauline'	sc	2	2	Y	N	106	268	76
6	male	pauline'	sc	2	1	Y	N	95	238	64
6	male	pauline'	sc	2	2	Y	N	90	280	62
6	male	pauline'	nc	2	1	N	N	101	212	72
6	male	pauline'	nc	2	2	N	N	121	287	75
6	male	pauline'	nc	2	1	N	N	95	253	73
6	male	pauline'	nc	2	2	N	N	98	298	72
6	male	U2	sc	2	1	Y	N	110	122	80
6	male	U2	sc	2	2	Y	N	108	203	80
6	male	U2	sc	2	1	Y	N	102	177	76
6	male	U2	sc	2	2	Y	N	105	250	74
6	male	U2	nc	2	1	N	N	105	221	75
6	male	U2	nc	2	1	N	N	88	134	73
6	male	U2	nc	2	2	N	N	120	419	78
6	male	UN	sc	2	1	Y	N	115	158	81
6	male	UN	sc	2	2	Y	N	110	262	76
6	male	UN	sc	2	1	Y	N	99	194	69
6	male	UN	sc	2	2	Y	N	98	225	67
6	male	UN	nc	2	2	Y	N	121	126	71
6	male	UN	nc	2	2	Y	N	106	220	73
6	male	cocaine	sc	2	1	Y	N	117	173	69
6	male	cocaine	sc	2	2	Y	N	114	264	68
6	male	cocaine	sc	2	1	N	N	99	366	74
6	male	cocaine	sc	2	2	N	N	99	783	72
6	male	cocaine	nc	2	1	N	N	99	161	72
6	male	cocaine	nc	2	2	N	N	109	319	72
6	male	cocaine	nc	2	1	N	N	105	172	73
6	male	cocaine	nc	2	2	N	N	105	292	70
6	male	hotel	sc	2	2	Y	N	100	262	69
6	male	hotel	sc	2	1	Y	N	101	154	73
6	male	hotel	sc	2	2	Y	N	101	235	71
6	male	hotel	nc	2	2	Y	N	102	239	70
6	male	hotel	nc	2	1	N	N	104	172	73
6	male	hotel	nc	2	2	N	N	99	263	72
6	male	Jose	sc	2	1	N	N	124	146	74
6	male	Jose	sc	2	2	N	N	115	196	77
6	male	Jose	sc	2	1	Y	N	98	175	66
6	male	Jose	sc	2	2	Y	N	97	272	68

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
6	male	Jose	nc	2	1	N	N	100	164	77
6	male	Jose	nc	2	2	N	N	98	328	77
6	male	Jose	nc	2	1	N	N	98	245	75
6	male	Jose	nc	2	2	N	N	95	304	75
6	male	overt	sc	2	2	Y	N	114	281	78
6	male	overt	sc	2	1	N	N	98	193	74
6	male	overt	sc	2	2	N	N	95	354	74
6	male	overt	nc	2	2	Y	N	105	302	75
6	male	overt	nc	2	1	N	N	107	230	73
6	male	overt	nc	2	2	N	N	91	292	74
6	male	robust	sc	2	1	Y	N	106	132	75
6	male	robust	sc	2	2	Y	N	104	210	74
6	male	robust	sc	2	2	Y	N	103	307	60
6	male	robust	nc	2	1	N	N	98	177	75
6	male	robust	nc	2	2	N	N	116	330	78
6	male	robust	nc	2	1	N	N	98	175	70
6	male	robust	nc	2	2	N	N	101	337	75
6	male	rotund	sc	2	2	Y	N	106	465	67
6	male	rotund	sc	2	1	N	N	84	162	74
6	male	rotund	sc	2	2	N	N	104	453	73
6	male	rotund	nc	2	1	N	N	101	233	73
6	male	rotund	nc	2	2	N	N	115	379	70
6	male	rotund	nc	2	1	N	N	81	148	67
6	male	rotund	nc	2	2	N	N	82	204	64
6	male	Chinese	sc	2	1	Y	N	121	231	77
6	male	Chinese	sc	2	2	Y	N	117	278	77
6	male	Chinese	sc	2	1	Y	N	110	237	69
6	male	Chinese	sc	2	2	Y	N	102	240	67
6	male	Chinese	nc	2	2	Y	N	113	308	69
6	male	Chinese	nc	2	1	N	N	109	245	69
6	male	Chinese	nc	2	2	N	N	107	309	70
7	female	preempt	sc	2	1	N	N	240	183	68
7	female	preempt	sc	2	2	N	N	235	207	68
7	female	preempt	sc	2	1	Y	N	147	184	65
7	female	preempt	sc	2	2	Y	N	135	286	60
7	female	preempt	nc	2	1	N	N	204	137	64
7	female	preempt	nc	2	2	N	N	225	207	64
7	female	preempt	nc	2	1	N	N	151	172	64
7	female	preempt	nc	2	2	N	N	145	233	64
7	female	rebuild	sc	2	1	Y	N	182	178	73
7	female	rebuild	sc	2	2	Y	N	143	262	79
7	female	rebuild	sc	2	1	N	N	187	137	66
7	female	rebuild	sc	2	2	N	N	151	232	67
7	female	rebuild	nc	2	1	N	N	201	126	69
7	female	rebuild	nc	2	2	N	N	201	233	72
7	female	rebuild	nc	2	1	N	N	208	130	68
7	female	rebuild	nc	2	2	N	N	141	209	67
7	female	chartreuse	sc	2	1	N	N	175	226	65

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
7	female	chartreuse	sc	2	2	N	N	201	276	66
7	female	chartreuse	sc	2	1	Y	N	156	265	70
7	female	chartreuse	sc	2	2	Y	N	152	319	71
7	female	chartreuse	nc	2	1	N	N	172	161	66
7	female	chartreuse	nc	2	2	N	N	216	346	66
7	female	chartreuse	nc	2	1	N	N	159	247	64
7	female	chartreuse	nc	2	2	N	N	225	287	65
7	female	parquet	sc	2	2	Y	N	137	200	70
7	female	parquet	sc	2	1	N	N	141	193	64
7	female	parquet	sc	2	2	N	N	143	232	62
7	female	parquet	nc	2	1	N	N	234	173	69
7	female	parquet	nc	2	2	N	N	240	198	67
7	female	parquet	nc	2	1	N	N	153	184	61
7	female	parquet	nc	2	2	N	N	162	327	61
7	female	pontoon	sc	2	1	N	N	151	194	62
7	female	pontoon	sc	2	2	N	N	200	363	61
7	female	pontoon	sc	2	1	N	N	190	219	65
7	female	pontoon	sc	2	2	N	N	212	307	66
7	female	pontoon	nc	2	2	Y	N	172	247	69
7	female	pontoon	nc	2	1	N	N	175	259	62
7	female	pontoon	nc	2	2	N	N	183	360	60
7	female	stockade	sc	2	2	Y	N	256	158	71
7	female	stockade	sc	2	1	N	N	151	246	69
7	female	stockade	sc	2	2	N	N	172	276	65
7	female	stockade	nc	2	1	N	N	184	246	70
7	female	stockade	nc	2	2	N	N	193	166	65
7	female	stockade	nc	2	1	N	N	151	272	63
7	female	stockade	nc	2	2	N	N	140	290	60
7	female	antique	sc	2	2	Y	N	250	173	75
7	female	antique	sc	2	1	N	N	147	144	64
7	female	antique	sc	2	2	N	N	204	344	62
7	female	antique	nc	2	2	Y	N	232	139	69
7	female	antique	nc	2	1	N	N	153	126	63
7	female	antique	nc	2	2	N	N	155	276	63
7	female	bamboo	sc	2	1	N	N	187	139	70
7	female	bamboo	sc	2	2	N	N	216	134	70
7	female	bamboo	sc	2	1	Y	N	169	207	74
7	female	bamboo	nc	2	1	N	N	199	219	78
7	female	bamboo	nc	2	1	N	N	151	165	66
7	female	bamboo	nc	2	2	N	N	151	176	65
7	female	cascade	sc	2	2	Y	N	192	235	75
7	female	cascade	sc	2	1	Y	N	167	325	68
7	female	cascade	sc	2	2	Y	N	175	317	67
7	female	cascade	nc	2	2	Y	N	152	157	71
7	female	cascade	nc	2	1	N	N	145	281	63
7	female	cascade	nc	2	2	N	N	153	330	64
7	female	flambeau	sc	2	1	Y	N	165	220	71
7	female	flambeau	sc	2	2	Y	N	161	167	72

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
7	female	flambeau	sc	2	2	Y	N	155	185	72
7	female	flambeau	nc	2	1	N	N	212	229	67
7	female	flambeau	nc	2	2	N	N	134	187	65
7	female	flambeau	nc	2	1	N	N	155	241	67
7	female	flambeau	nc	2	2	N	N	151	162	67
7	female	taboo	sc	2	2	Y	N	245	219	74
7	female	taboo	sc	2	1	N	N	162	190	65
7	female	taboo	sc	2	2	N	N	172	192	66
7	female	taboo	nc	2	2	Y	N	290	234	66
7	female	taboo	nc	2	1	N	N	162	177	65
7	female	taboo	nc	2	2	N	N	187	156	67
7	female	tableau	sc	2	1	Y	N	169	221	76
7	female	tableau	sc	2	2	Y	N	145	230	72
7	female	tableau	sc	2	1	N	N	153	202	65
7	female	tableau	sc	2	2	N	N	162	216	67
7	female	tableau	nc	2	1	N	N	172	193	67
7	female	tableau	nc	2	2	N	N	181	244	67
7	female	tableau	nc	2	1	N	N	155	175	62
7	female	tableau	nc	2	2	N	N	151	187	63
7	female	impure	sc	2	1	Y	N	189	208	72
7	female	impure	sc	2	2	Y	N	164	236	67
7	female	impure	sc	2	1	N	N	162	251	63
7	female	impure	sc	2	2	N	N	162	170	66
7	female	impure	nc	2	1	N	N	180	163	62
7	female	impure	nc	2	2	N	N	234	346	64
7	female	impure	nc	2	1	N	N	167	296	65
7	female	impure	nc	2	2	N	N	172	167	66
7	female	inept	sc	2	1	N	N	134	65	67
7	female	inept	sc	2	2	N	N	147	233	64
7	female	inept	sc	2	2	Y	N	124	191	70
7	female	inept	nc	2	1	N	N	141	104	63
7	female	inept	nc	2	2	N	N	155	295	60
7	female	inept	nc	2	2	Y	N	159	219	71
7	female	thirteen	sc	2	2	Y	N	213	329	70
7	female	thirteen	sc	2	2	Y	N	196	298	76
7	female	thirteen	nc	2	1	N	N	160	186	69
7	female	thirteen	nc	2	2	N	N	190	287	67
7	female	thirteen	nc	2	1	N	N	151	153	69
7	female	thirteen	nc	2	2	N	N	172	228	65
7	female	fourteen	sc	2	2	Y	N	189	359	68
7	female	fourteen	sc	2	1	Y	N	192	148	71
7	female	fourteen	sc	2	2	Y	N	200	226	71
7	female	fourteen	nc	2	1	Y	N	245	253	80
7	female	fourteen	nc	2	2	Y	N	277	349	77
7	female	fourteen	nc	2	1	Y	N	178	196	76
7	female	fourteen	nc	2	2	Y	N	179	219	73
7	female	georgett	sc	2	1	Y	N	196	203	73
7	female	georgett	sc	2	2	Y	N	181	239	70

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
7	female	georgett	sc	2	1	N	N	167	225	66
7	female	georgett	sc	2	2	N	N	162	284	66
7	female	georgett	nc	2	1	N	N	167	269	69
7	female	georgett	nc	2	2	N	N	172	208	69
7	female	georgett	nc	2	1	N	N	140	167	60
7	female	georgett	nc	2	2	N	N	167	276	60
7	female	pauline'	sc	2	1	N	N	193	191	71
7	female	pauline'	sc	2	2	N	N	200	327	68
7	female	pauline'	sc	2	2	Y	N	179	239	72
7	female	pauline'	nc	2	1	N	N	225	217	71
7	female	pauline'	nc	2	2	N	N	282	259	69
7	female	pauline'	nc	2	1	N	N	151	253	63
7	female	pauline'	nc	2	2	N	N	151	311	60
7	female	duet	sc	2	2	Y	N	182	114	76
7	female	duet	sc	2	1	N	N	193	110	61
7	female	duet	sc	2	2	N	N	204	193	60
7	female	duet	nc	2	1	N	N	187	143	65
7	female	duet	nc	2	2	N	N	190	133	68
7	female	duet	nc	2	1	N	N	155	126	66
7	female	duet	nc	2	2	N	N	147	147	68
7	female	lunette	sc	2	1	N	N	147	135	60
7	female	lunette	sc	2	2	N	N	172	174	63
7	female	lunette	sc	2	1	N	N	151	159	61
7	female	lunette	sc	2	2	N	N	162	129	62
7	female	lunette	nc	2	1	Y	N	208	162	75
7	female	lunette	nc	2	2	Y	N	179	265	72
7	female	lunette	nc	2	1	N	N	167	155	66
7	female	lunette	nc	2	2	N	N	180	153	65
7	female	U2	sc	2	1	Y	N	200	124	73
7	female	U2	sc	2	2	Y	N	182	225	72
7	female	U2	sc	2	1	Y	N	179	125	72
7	female	U2	sc	2	2	Y	N	161	229	71
7	female	U2	nc	2	2	Y	N	181	293	71
7	female	U2	nc	2	1	N	N	167	131	72
7	female	U2	nc	2	2	N	N	196	226	75
7	female	UN	sc	2	2	Y	N	233	196	73
7	female	UN	sc	2	1	N	N	162	155	67
7	female	UN	sc	2	2	N	N	172	154	69
7	female	UN	nc	2	2	Y	N	278	69	74
7	female	UN	nc	2	1	N	N	153	163	61
7	female	UN	nc	2	2	N	N	167	238	59
7	female	cocaine	sc	2	2	Y	N	200	245	74
7	female	cocaine	sc	2	1	N	N	167	162	62
7	female	cocaine	sc	2	2	N	N	216	339	63
7	female	cocaine	nc	2	1	N	N	180	153	67
7	female	cocaine	nc	2	2	N	N	239	303	67
7	female	cocaine	nc	2	1	N	N	184	144	65
7	female	cocaine	nc	2	2	N	N	212	270	67

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
7	female	overt	sc	2	1	N	N	184	138	72
7	female	overt	sc	2	2	N	N	220	169	70
7	female	overt	sc	2	1	N	N	151	136	69
7	female	overt	sc	2	2	N	N	151	180	65
7	female	overt	nc	2	2	Y	N	189	270	75
7	female	overt	nc	2	1	N	N	162	138	67
7	female	overt	nc	2	2	N	N	162	262	64
7	female	robust	sc	2	2	Y	N	170	277	69
7	female	robust	sc	2	2	Y	N	164	316	69
7	female	robust	nc	2	1	N	N	167	196	72
7	female	robust	nc	2	2	N	N	181	321	74
7	female	robust	nc	2	1	N	N	153	137	63
7	female	robust	nc	2	2	N	N	145	318	62
7	female	rosanne	sc	2	1	N	N	186	177	67
7	female	rosanne	sc	2	2	N	N	172	345	66
7	female	rosanne	sc	2	1	Y	N	152	246	76
7	female	rosanne	sc	2	2	Y	N	143	401	70
7	female	rosanne	nc	2	1	N	N	282	159	65
7	female	rosanne	nc	2	2	N	N	256	177	67
7	female	rosanne	nc	2	1	N	N	155	172	68
7	female	rosanne	nc	2	2	N	N	167	278	65
7	female	Chinese	sc	2	2	Y	N	212	206	74
7	female	Chinese	sc	2	1	Y	N	189	241	70
7	female	Chinese	sc	2	2	Y	N	188	202	66
7	female	Chinese	nc	2	1	Y	N	192	205	72
7	female	Chinese	nc	2	2	Y	N	196	194	72
7	female	Chinese	nc	2	1	Y	N	181	230	73
7	female	Chinese	nc	2	2	Y	N	192	212	73
8	male	blockade	sc	2	2	Y	N	162	208	79
8	male	blockade	sc	2	1	Y	N	140	137	78
8	male	blockade	sc	2	2	Y	N	135	212	72
8	male	blockade	nc	2	1	N	N	143	159	71
8	male	blockade	nc	2	2	N	N	153	182	70
8	male	blockade	nc	2	1	N	N	131	169	71
8	male	blockade	nc	2	2	N	N	143	210	70
8	male	pontoon	sc	2	1	N	N	172	235	82
8	male	pontoon	sc	2	2	N	N	181	261	80
8	male	pontoon	sc	2	1	N	N	151	180	68
8	male	pontoon	nc	2	1	N	N	151	234	71
8	male	pontoon	nc	2	2	N	N	167	271	70
8	male	pontoon	nc	2	1	Y	N	162	221	77
8	male	pontoon	nc	2	2	Y	N	172	243	79
8	male	stockade	sc	2	2	Y	N	143	198	76
8	male	stockade	sc	2	1	N	N	135	229	67
8	male	stockade	sc	2	2	N	N	141	206	67
8	male	stockade	nc	2	1	N	N	113	271	64
8	male	stockade	nc	2	2	N	N	141	264	69
8	male	stockade	nc	2	1	N	N	141	133	69

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
8	male	stockade	nc	2	2	N	N	145	275	67
8	male	bayonne	sc	2	1	N	N	136	316	69
8	male	bayonne	sc	2	2	N	N	140	117	67
8	male	bayonne	sc	2	1	Y	N	131	149	77
8	male	bayonne	sc	2	2	Y	N	128	165	75
8	male	bayonne	nc	2	1	N	N	121	133	71
8	male	bayonne	nc	2	2	N	N	126	342	70
8	male	bayonne	nc	2	1	N	N	108	121	64
8	male	bayonne	nc	2	2	N	N	117	243	66
8	male	antique	sc	2	1	Y	N	175	178	80
8	male	antique	sc	2	2	Y	N	180	193	78
8	male	antique	sc	2	1	N	N	143	168	70
8	male	antique	sc	2	2	N	N	184	209	69
8	male	antique	nc	2	1	N	N	162	109	72
8	male	antique	nc	2	2	N	N	212	122	72
8	male	antique	nc	2	1	N	N	151	119	67
8	male	antique	nc	2	2	N	N	155	207	66
8	male	bamboo	sc	2	1	Y	N	172	178	79
8	male	bamboo	sc	2	1	N	N	125	212	71
8	male	bamboo	sc	2	2	N	N	128	126	72
8	male	bamboo	nc	2	1	N	N	147	121	69
8	male	bamboo	nc	2	2	N	N	172	247	71
8	male	bamboo	nc	2	1	N	N	135	214	73
8	male	bamboo	nc	2	2	N	N	135	196	73
8	male	impure	sc	2	1	Y	N	204	127	82
8	male	impure	sc	2	2	Y	N	184	256	80
8	male	impure	sc	2	1	Y	N	153	122	73
8	male	impure	nc	2	1	N	N	181	160	73
8	male	impure	nc	2	1	N	N	123	94	67
8	male	impure	nc	2	2	N	N	121	150	66
8	male	inept	sc	2	1	N	N	167	122	66
8	male	inept	sc	2	2	N	N	162	230	70
8	male	inept	sc	2	1	Y	N	162	162	76
8	male	inept	nc	2	1	N	N	141	100	68
8	male	inept	nc	2	2	N	N	141	225	70
8	male	inept	nc	2	2	Y	N	151	251	73
8	male	infirm	sc	2	1	Y	N	175	149	75
8	male	infirm	sc	2	2	Y	N	172	213	76
8	male	infirm	sc	2	1	Y	N	193	186	76
8	male	infirm	sc	2	2	Y	N	172	331	74
8	male	infirm	nc	2	1	Y	N	172	154	76
8	male	infirm	nc	2	2	Y	N	153	276	75
8	male	infirm	nc	2	2	Y	N	145	205	75
8	male	festoon	sc	2	1	Y	N	216	221	76
8	male	festoon	sc	2	2	Y	N	172	233	73
8	male	festoon	sc	2	1	N	N	155	198	67
8	male	festoon	sc	2	2	N	N	172	302	70
8	male	festoon	nc	2	1	N	N	172	212	73

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
8	male	festoon	nc	2	2	N	N	190	195	70
8	male	festoon	nc	2	1	N	N	131	210	62
8	male	festoon	nc	2	2	N	N	180	254	68
8	male	thirteen	sc	2	1	Y	N	172	144	80
8	male	thirteen	sc	2	2	Y	N	172	261	75
8	male	thirteen	sc	2	1	Y	N	153	117	79
8	male	thirteen	sc	2	2	Y	N	147	231	78
8	male	thirteen	nc	2	1	N	N	155	137	68
8	male	thirteen	nc	2	2	N	N	162	178	67
8	male	thirteen	nc	2	1	N	N	141	149	68
8	male	thirteen	nc	2	2	N	N	141	296	66
8	male	fourteen	sc	2	2	Y	N	190	190	80
8	male	fourteen	sc	2	1	Y	N	166	158	74
8	male	fourteen	nc	2	1	Y	N	172	138	78
8	male	fourteen	nc	2	2	Y	N	162	248	76
8	male	fourteen	nc	2	2	Y	N	162	214	77
8	male	georgett	sc	2	1	Y	N	140	177	78
8	male	georgett	sc	2	2	Y	N	131	193	79
8	male	georgett	sc	2	1	N	N	126	148	71
8	male	georgett	sc	2	2	N	N	134	237	73
8	male	georgett	nc	2	1	N	N	151	255	75
8	male	georgett	nc	2	2	N	N	155	177	74
8	male	georgett	nc	2	1	N	N	141	153	75
8	male	georgett	nc	2	2	N	N	140	239	75
8	male	ordeal	sc	2	2	Y	N	167	185	78
8	male	ordeal	sc	2	1	N	N	141	100	68
8	male	ordeal	sc	2	2	N	N	131	329	71
8	male	ordeal	nc	2	1	N	N	160	117	73
8	male	ordeal	nc	2	2	N	N	167	184	75
8	male	ordeal	nc	2	1	N	N	141	120	70
8	male	ordeal	nc	2	2	N	N	131	199	70
8	male	pauline'	sc	2	1	N	N	147	202	73
8	male	pauline'	sc	2	2	N	N	151	235	73
8	male	pauline'	sc	2	1	Y	N	143	194	76
8	male	pauline'	sc	2	2	Y	N	147	258	73
8	male	pauline'	nc	2	1	N	N	153	183	70
8	male	pauline'	nc	2	2	N	N	172	203	68
8	male	pauline'	nc	2	1	N	N	143	222	71
8	male	pauline'	nc	2	2	N	N	145	267	67
8	male	hotel	sc	2	1	N	N	208	64	67
8	male	hotel	sc	2	2	N	N	204	160	71
8	male	hotel	sc	2	1	N	N	131	66	74
8	male	hotel	sc	2	2	N	N	136	195	74
8	male	hotel	nc	2	1	Y	N	131	102	75
8	male	hotel	nc	2	2	Y	N	131	194	74
8	male	hotel	nc	2	1	N	N	147	113	60
8	male	hotel	nc	2	2	N	N	167	159	61

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
8	male	rosanne	sc	2	1	Y	N	141	278	79
8	male	rosanne	sc	2	2	Y	N	143	321	76
8	male	rosanne	sc	2	1	N	N	134	199	73
8	male	rosanne	sc	2	2	N	N	134	257	70
8	male	rosanne	nc	2	1	N	N	134	180	68
8	male	rosanne	nc	2	2	N	N	147	255	68
8	male	rosanne	nc	2	1	N	N	143	130	67
8	male	rosanne	nc	2	2	N	N	153	274	68
8	male	rotund	sc	2	1	N	N	141	129	74
8	male	rotund	sc	2	2	N	N	162	230	70
8	male	rotund	sc	2	1	Y	N	136	115	75
8	male	rotund	sc	2	2	Y	N	136	272	72
8	male	rotund	nc	2	2	Y	N	151	196	74
8	male	rotund	nc	2	1	N	N	128	130	72
8	male	rotund	nc	2	2	N	N	136	267	70
8	male	Chinese	sc	2	1	Y	N	167	164	78
8	male	Chinese	sc	2	2	Y	N	160	204	76
8	male	Chinese	sc	2	1	Y	N	153	212	76
8	male	Chinese	sc	2	2	Y	N	153	188	76
8	male	Chinese	nc	2	1	N	N	162	199	70
8	male	Chinese	nc	2	2	N	N	162	227	71
8	male	Chinese	nc	2	1	N	N	136	194	68
8	male	Chinese	nc	2	2	N	N	145	199	68
9	male	rebuild	sc	2	1	Y	N	115	144	77
9	male	rebuild	sc	2	1	N	N	103	184	68
9	male	rebuild	sc	2	2	N	N	116	212	71
9	male	rebuild	nc	2	1	N	N	94	143	67
9	male	rebuild	nc	2	2	N	N	100	212	71
9	male	rebuild	nc	2	1	N	N	101	166	67
9	male	rebuild	nc	2	2	N	N	102	177	70
9	male	parquet	sc	2	2	Y	N	147	191	73
9	male	parquet	sc	2	1	N	N	97	108	63
9	male	parquet	sc	2	2	N	N	104	192	63
9	male	parquet	nc	2	1	N	N	141	178	67
9	male	parquet	nc	2	2	N	N	147	204	66
9	male	parquet	nc	2	1	N	N	99	181	65
9	male	parquet	nc	2	2	N	N	131	247	65
9	male	blockade	sc	2	1	Y	N	115	229	77
9	male	blockade	sc	2	2	Y	N	109	213	77
9	male	blockade	sc	2	1	N	N	86	174	66
9	male	blockade	sc	2	2	N	N	120	287	66
9	male	blockade	nc	2	1	N	N	94	165	67
9	male	blockade	nc	2	2	N	N	116	309	64
9	male	blockade	nc	2	1	N	N	95	170	71
9	male	blockade	nc	2	2	N	N	116	154	70
9	male	stockade	sc	2	1	Y	N	108	180	75
9	male	stockade	sc	2	1	N	N	97	260	66
9	male	stockade	sc	2	2	N	N	116	286	65

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
9	male	stockade	nc	2	1	Y	N	103	88	72
9	male	stockade	nc	2	2	Y	N	125	299	71
9	male	stockade	nc	2	1	N	N	109	267	67
9	male	stockade	nc	2	2	N	N	121	260	70
9	male	ballet	sc	2	1	Y	N	104	218	74
9	male	ballet	sc	2	1	N	N	98	166	65
9	male	ballet	nc	2	2	N	N	103	173	67
9	male	ballet	nc	2	1	Y	N	93	192	73
9	male	ballet	nc	2	2	Y	N	108	220	74
9	male	ballet	nc	2	1	N	N	98	175	65
9	male	ballet	sc	2	2	N	N	105	174	66
9	male	cafe	sc	2	1	N	N	104	190	66
9	male	cafe	sc	2	2	N	N	151	247	70
9	male	cafe	sc	2	1	Y	N	110	172	68
9	male	cafe	sc	2	2	Y	N	97	235	70
9	male	cafe	nc	2	1	N	N	100	179	64
9	male	cafe	nc	2	2	N	N	110	217	70
9	male	cafe	nc	2	1	N	N	98	166	60
9	male	cafe	nc	2	2	N	N	95	308	61
9	male	cascade	sc	2	1	N	N	90	268	62
9	male	cascade	sc	2	2	N	N	109	237	66
9	male	cascade	sc	2	1	N	N	110	258	68
9	male	cascade	sc	2	2	N	N	116	210	68
9	male	cascade	nc	2	2	Y	N	120	157	75
9	male	cascade	nc	2	1	N	N	109	289	63
9	male	cascade	nc	2	2	N	N	106	236	66
9	male	flambeau	sc	2	1	Y	N	108	341	69
9	male	flambeau	sc	2	1	N	N	98	213	62
9	male	flambeau	sc	2	2	N	N	95	170	67
9	male	flambeau	nc	2	1	N	N	78	307	62
9	male	flambeau	nc	2	2	N	N	107	231	70
9	male	flambeau	nc	2	1	N	N	102	273	61
9	male	flambeau	nc	2	2	N	N	109	211	63
9	male	tableau	sc	2	1	N	N	114	200	61
9	male	tableau	sc	2	2	N	N	131	335	69
9	male	tableau	sc	2	1	Y	N	111	321	78
9	male	tableau	sc	2	2	Y	N	101	321	78
9	male	tableau	nc	2	1	Y	N	116	231	71
9	male	tableau	nc	2	2	Y	N	116	254	73
9	male	tableau	nc	2	1	N	N	107	205	61
9	male	tableau	nc	2	2	N	N	109	258	69
9	male	impure	sc	2	1	N	N	86	88	62
9	male	impure	sc	2	2	N	N	125	277	67
9	male	impure	sc	2	2	Y	N	108	285	74
9	male	impure	nc	2	1	N	N	94	153	65
9	male	impure	nc	2	2	N	N	128	351	69
9	male	impure	nc	2	1	N	N	98	99	61
9	male	impure	nc	2	2	N	N	102	246	66

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
9	male	infirm	sc	2	2	Y	N	118	198	69
9	male	infirm	sc	2	1	N	N	98	284	60
9	male	infirm	sc	2	2	N	N	103	87	63
9	male	infirm	nc	2	1	N	N	94	108	64
9	male	infirm	nc	2	2	N	N	125	353	66
9	male	infirm	nc	2	1	N	N	91	75	64
9	male	infirm	nc	2	2	N	N	103	274	67
9	male	thirteen	sc	2	1	Y	N	109	175	75
9	male	thirteen	sc	2	2	Y	N	114	258	72
9	male	thirteen	sc	2	1	Y	N	125	168	74
9	male	thirteen	nc	2	1	N	N	116	212	66
9	male	thirteen	nc	2	2	N	N	117	230	61
9	male	thirteen	nc	2	1	N	N	103	222	68
9	male	thirteen	nc	2	2	N	N	119	256	68
9	male	fourteen	sc	2	1	Y	N	122	177	72
9	male	fourteen	sc	2	1	Y	N	147	194	77
9	male	fourteen	sc	2	2	Y	N	102	260	70
9	male	fourteen	nc	2	2	Y	N	149	302	74
9	male	fourteen	nc	2	1	Y	N	135	170	75
9	male	pauline'	sc	2	1	N	N	102	202	68
9	male	pauline'	sc	2	2	N	N	125	266	66
9	male	pauline'	sc	2	1	Y	N	122	150	71
9	male	pauline'	sc	2	2	Y	N	96	257	69
9	male	pauline'	nc	2	1	N	N	105	195	67
9	male	pauline'	nc	2	2	N	N	116	328	65
9	male	pauline'	nc	2	1	N	N	120	179	66
9	male	pauline'	nc	2	2	N	N	121	357	66
9	male	U2	sc	2	1	Y	N	137	194	75
9	male	U2	sc	2	1	Y	N	102	163	79
9	male	U2	sc	2	2	Y	N	106	253	77
9	male	U2	nc	2	1	N	N	125	155	70
9	male	U2	nc	2	2	N	N	141	213	68
9	male	U2	nc	2	1	N	N	102	183	66
9	male	U2	nc	2	2	N	N	120	293	71
9	male	UN	sc	2	1	Y	N	149	189	78
9	male	UN	sc	2	1	Y	N	104	152	73
9	male	UN	sc	2	2	Y	N	110	158	73
9	male	UN	nc	2	2	Y	N	145	120	79
9	male	UN	nc	2	1	Y	N	97	115	71
9	male	UN	nc	2	2	Y	N	97	176	67
9	male	hotel	sc	2	1	Y	N	128	120	74
9	male	hotel	sc	2	2	Y	N	137	196	73
9	male	hotel	sc	2	1	N	N	98	111	62
9	male	hotel	sc	2	2	N	N	125	229	64
9	male	hotel	nc	2	1	N	N	98	112	65
9	male	hotel	nc	2	2	N	N	121	235	67
9	male	hotel	nc	2	1	N	N	116	116	65
9	male	hotel	nc	2	2	N	N	125	321	67

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
9	male	rosanne	sc	2	1	Y	N	107	226	76
9	male	rosanne	sc	2	2	Y	N	120	143	74
9	male	rosanne	sc	2	1	N	N	98	169	67
9	male	rosanne	sc	2	2	N	N	102	261	65
9	male	rosanne	nc	2	1	N	N	96	141	63
9	male	rosanne	nc	2	2	N	N	115	282	67
9	male	rosanne	nc	2	1	N	N	103	126	68
9	male	rosanne	nc	2	2	N	N	115	302	66
9	male	Chinese	sc	2	2	Y	N	135	185	75
9	male	Chinese	sc	2	1	N	N	116	191	62
9	male	Chinese	sc	2	2	N	N	101	202	64
9	male	Chinese	nc	2	1	N	N	11	187	64
9	male	Chinese	nc	2	2	N	N	113	227	65
9	male	Chinese	nc	2	1	Y	N	127	183	72
9	male	Chinese	nc	2	2	Y	N	115	251	74
10	female	antique	sc	2	1	N	N	234	246	72
10	female	antique	sc	2	2	N	N	290	142	68
10	female	antique	sc	2	1	N	N	212	162	68
10	female	antique	sc	2	2	N	N	225	144	68
10	female	antique	nc	2	1	N	N	221	188	74
10	female	antique	nc	2	1	Y	N	193	173	72
10	female	antique	nc	2	2	Y	N	213	174	74
10	female	cafe	sc	2	1	N	N	212	124	71
10	female	cafe	sc	2	2	N	N	225	245	72
10	female	cafe	sc	2	1	Y	N	182	199	72
10	female	cafe	sc	2	2	Y	N	169	292	72
10	female	cafe	nc	2	1	N	N	208	131	69
10	female	cafe	nc	2	2	N	N	212	306	70
10	female	cafe	nc	2	1	N	N	201	150	69
10	female	cafe	nc	2	2	N	N	201	322	70
10	female	flambeau	sc	2	1	N	N	216	211	70
10	female	flambeau	sc	2	2	N	N	225	161	71
10	female	flambeau	sc	2	1	Y	N	229	328	79
10	female	flambeau	sc	2	2	Y	N	208	162	77
10	female	flambeau	nc	2	1	N	N	216	286	74
10	female	flambeau	nc	2	2	N	N	245	177	72
10	female	flambeau	nc	2	2	N	N	190	245	68
10	female	festoon	sc	2	1	N	N	216	245	67
10	female	festoon	sc	2	2	N	N	282	252	75
10	female	festoon	sc	2	1	Y	N	196	170	76
10	female	festoon	sc	2	2	Y	N	204	214	76
10	female	festoon	nc	2	1	N	N	204	227	72
10	female	festoon	nc	2	2	N	N	268	230	72
10	female	festoon	nc	2	1	N	N	178	206	72
10	female	festoon	nc	2	2	N	N	208	241	76
10	female	fourteen	sc	2	1	Y	N	264	145	77
10	female	fourteen	sc	2	2	Y	N	270	297	72
10	female	fourteen	sc	2	1	Y	N	233	266	80

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
10	female	fourteen	sc	2	2	Y	N	232	294	75
10	female	fourteen	nc	2	1	N	N	256	201	73
10	female	fourteen	nc	2	2	N	N	256	325	70
10	female	fourteen	nc	2	2	Y	N	250	252	79
10	female	U2	sc	2	2	N	N	245	157	67
10	female	U2	sc	2	2	N	N	225	134	68
10	female	U2	nc	2	1	Y	N	244	246	78
10	female	U2	nc	2	1	N	N	212	130	73
10	female	U2	nc	2	2	N	N	256	279	76
10	female	UN	sc	2	2	N	N	256	241	71
10	female	UN	sc	2	1	N	N	212	195	70
10	female	UN	sc	2	2	N	N	212	244	69
10	female	UN	nc	2	1	N	N	268	174	71
10	female	UN	nc	2	2	N	N	282	184	71
10	female	UN	nc	2	1	Y	N	209	151	79
10	female	UN	nc	2	2	Y	N	204	196	76
10	female	Jose	sc	2	2	N	N	268	167	71
10	female	Jose	sc	2	1	Y	N	213	168	78
10	female	Jose	sc	2	2	Y	N	196	203	78
10	female	Jose	nc	2	1	N	N	212	155	70
10	female	Jose	nc	2	2	N	N	245	226	70
10	female	Jose	nc	2	1	N	N	184	182	66
10	female	Jose	nc	2	2	N	N	184	215	66
10	female	overt	sc	2	1	N	N	208	189	71
10	female	overt	sc	2	2	N	N	204	134	73
10	female	overt	sc	2	1	N	N	160	89	67
10	female	overt	sc	2	2	N	N	181	112	68
10	female	overt	nc	2	1	Y	N	272	188	77
10	female	overt	nc	2	2	Y	N	254	238	75
10	female	overt	nc	2	1	N	N	184	147	72
10	female	overt	nc	2	2	N	N	184	253	68
10	female	robust	sc	2	2	N	N	256	281	71
10	female	robust	sc	2	2	Y	N	208	224	80
10	female	robust	nc	2	2	N	N	216	285	71
10	female	robust	nc	2	2	Y	N	186	378	74
10	female	rotund	sc	2	1	N	N	212	198	76
10	female	rotund	sc	2	2	N	N	240	293	72
10	female	rotund	sc	2	1	N	N	172	162	66
10	female	rotund	sc	2	2	N	N	201	294	68
10	female	rotund	nc	2	2	Y	N	238	274	77
10	female	rotund	nc	2	2	N	N	208	221	68
4	female	Chinese	sc	2	1	Y	Y	197	234	77
4	female	Chinese	sc	2	1	Y	Y	191	241	62
4	female	Chinese	nc	2	1	Y	Y	172	234	68
4	female	Chinese	nc	2	1	Y	Y	193	230	61
5	male	rebuild	nc	2	1	N	Y	135	115	77
5	male	cafe	sc	2	1	Y	Y	117	151	68
5	male	infirm	nc	2	1	Y	Y	126	163	67

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
5	male	thirteen	sc	2	1	Y	Y	131	114	72
5	male	thirteen	sc	2	1	Y	Y	125	111	67
5	male	thirteen	nc	2	1	Y	Y	125	123	65
5	male	thirteen	nc	2	1	Y	Y	125	120	69
5	male	fourteen	sc	2	1	Y	Y	135	116	65
5	male	fourteen	nc	2	1	Y	Y	125	108	68
5	male	U2	sc	2	1	N	Y	121	94	71
5	male	U2	sc	2	1	Y	Y	102	137	69
5	male	UN	nc	2	1	N	Y	126	120	71
5	male	robust	sc	2	1	Y	Y	124	159	75
5	male	Chinese	sc	2	2	N	Y	128	218	75
6	male	pontoon	sc	2	1	Y	Y	103	263	66
6	male	antique	nc	2	1	Y	Y	104	253	65
6	male	ballet	sc	2	1	Y	Y	98	200	70
6	male	campaign	sc	2	1	Y	Y	115	220	69
6	male	campaign	nc	2	2	Y	Y	103	271	76
6	male	cascade	nc	2	1	Y	Y	116	328	80
6	male	impure	sc	2	1	Y	Y	120	171	71
6	male	impure	nc	2	2	Y	Y	109	320	79
6	male	inept	sc	2	1	Y	Y	131	198	71
6	male	inept	nc	2	2	N	Y	108	255	71
6	male	infirm	nc	2	1	Y	Y	117	195	77
6	male	technique	sc	2	1	Y	Y	125	184	74
6	male	technique	nc	2	2	N	Y	104	234	69
6	male	thirteen	sc	2	1	Y	Y	124	210	74
6	male	thirteen	sc	2	2	Y	Y	103	244	77
6	male	fourteen	sc	2	1	Y	Y	129	210	73
6	male	fourteen	sc	2	1	Y	Y	116	221	79
6	male	fourteen	nc	2	1	Y	Y	106	261	79
6	male	ornate	sc	2	1	Y	Y	101	209	77
6	male	ornate	nc	2	1	Y	Y	114	125	66
6	male	ornate	nc	2	1	Y	Y	104	280	76
6	male	U2	nc	2	2	N	Y	110	316	74
6	male	UN	nc	2	1	Y	Y	121	130	74
6	male	UN	nc	2	1	Y	Y	108	180	78
6	male	hotel	sc	2	1	Y	Y	109	172	70
6	male	hotel	nc	2	1	Y	Y	102	197	72
6	male	overt	sc	2	1	Y	Y	117	225	77
6	male	overt	nc	2	1	Y	Y	107	166	79
6	male	robust	sc	2	1	Y	Y	106	225	77
6	male	rotund	sc	2	1	Y	Y	120	217	72
6	male	Chinese	nc	2	1	Y	Y	115	293	70
7	female	parquet	sc	2	1	Y	Y	182	188	72
7	female	pontoon	nc	2	1	Y	Y	204	247	73
7	female	stockade	sc	2	1	Y	Y	294	250	77
7	female	antique	sc	2	1	Y	Y	282	168	75
7	female	antique	nc	2	1	Y	Y	244	201	71
7	female	bamboo	sc	2	2	Y	Y	160	144	73

Table continues.

	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	A	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
7	female	bamboo	nc	2	2	N	Y	196	119	78
7	female	cascade	sc	2	1	Y	Y	238	316	75
7	female	cascade	nc	2	1	Y	Y	176	351	69
7	female	flambeau	sc	2	1	Y	Y	178	247	72
7	female	taboo	sc	2	1	Y	Y	238	211	75
7	female	taboo	nc	2	1	Y	Y	282	186	67
7	female	inet	sc	2	1	Y	Y	164	148	74
7	female	inet	nc	2	1	Y	Y	169	135	74
7	female	thirteen	sc	2	1	Y	Y	228	258	73
7	female	thirteen	sc	2	1	Y	Y	212	159	77
7	female	fourteen	sc	2	1	Y	Y	218	158	73
7	female	auline'	sc	2	1	Y	Y	176	244	73
7	female	duet	sc	2	1	Y	Y	256	157	77
7	female	U2	nc	2	1	Y	Y	175	183	71
7	female	UN	sc	2	1	Y	Y	244	139	73
7	female	UN	nc	2	1	Y	Y	279	105	74
7	female	cocaine	sc	2	1	Y	Y	227	200	75
7	female	overt	nc	2	1	Y	Y	227	127	78
7	female	robust	sc	2	1	Y	Y	200	162	71
7	female	robust	sc	2	1	Y	Y	196	216	72
7	female	Chinese	sc	2	1	Y	Y	213	207	75
8	male	blockade	sc	2	1	Y	Y	155	173	80
8	male	ontoon	sc	2	2	N	Y	172	227	71
8	male	stockade	sc	2	1	Y	Y	145	113	78
8	male	bamboo	sc	2	2	Y	Y	172	109	78
8	male	imure	sc	2	2	Y	Y	135	246	72
8	male	imure	nc	2	2	N	Y	187	289	70
8	male	inet	sc	2	2	Y	Y	136	127	76
8	male	inet	nc	2	1	Y	Y	153	133	73
8	male	infirm	nc	2	1	Y	Y	162	187	77
8	male	fourteen	sc	2	1	Y	Y	200	145	79
8	male	fourteen	sc	2	2	Y	Y	155	220	71
8	male	fourteen	nc	2	1	Y	Y	155	117	79
8	male	ordeal	sc	2	1	Y	Y	167	149	80
8	male	rotund	nc	2	1	Y	Y	151	160	80
9	male	rebuild	sc	2	2	Y	Y	119	271	79
9	male	arquet	sc	2	1	Y	Y	161	111	75
9	male	stockade	sc	2	2	Y	Y	128	268	75
9	male	ballet	sc	2	2	Y	Y	111	145	74
9	male	cascade	nc	2	1	Y	Y	114	297	70
9	male	flambeau	sc	2	2	Y	Y	115	196	74
9	male	imure	sc	2	1	Y	Y	111	193	72
9	male	infirm	sc	2	1	Y	Y	118	157	71
9	male	thirteen	sc	2	2	Y	Y	119	210	72
9	male	fourteen	sc	2	2	Y	Y	145	260	71
9	male	fourteen	nc	2	1	Y	Y	139	156	73
9	male	fourteen	nc	2	2	Y	Y	135	238	71
9	male	U2	sc	2	2	Y	Y	159	185	73

Table continues.

NUMBER	GENDER	WORD	CONTEXT	POSITION	SYLLABLE	SH	PA	FUNDAMENTAL FREQUENCY	DURATION	INTENSITY
9	male	UN	sc	2	2	Y	Y	137	150	78
9	male	UN	nc	2	1	Y	Y	137	169	76
9	male	Chinese	sc	2	1	Y	Y	134	190	72
10	female	antique	nc	2	2	N	Y	283	160	69
10	female	flambeau	nc	2	1	N	Y	190	328	70
10	female	fourteen	nc	2	1	Y	Y	256	213	80
10	female	U2	sc	2	1	N	Y	245	163	70
10	female	U2	sc	2	1	N	Y	225	141	68
10	female	U2	nc	2	2	Y	Y	285	388	79
10	female	UN	sc	2	1	N	Y	256	172	70
10	female	Jose	sc	2	1	N	Y	256	195	70
10	female	robust	sc	2	1	N	Y	245	195	74
10	female	robust	sc	2	1	Y	Y	227	229	82
10	female	robust	nc	2	1	N	Y	216	217	73
10	female	robust	nc	2	1	Y	Y	217	224	80
10	female	rotund	nc	2	1	Y	Y	263	186	80
10	female	rotund	nc	2	1	N	Y	190	164	67

Fundamental Frequency Scores (Hz)

SUBJECT gender	STRESS CLASH CONTEXT								NON-CLASH CONTEXT							
	SHIFT (Y)				SHIFT (N)				SHIFT (Y)				SHIFT (N)			
	SC1		SC2		SC1		SC2		NC1		NC2		NC1		NC2	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
1 female	192	197	178	178	174	192	177	182	195	198	181	180	182	198	174	183
2 female	210	211	178	174	181	210	167	172	213	201	186	182	183	191	165	177
4 female	199	209	183	179	185	204	175	180	200	207	191	181	172	196	170	176
7 female	218	192	175	164	177	196	163	175	223	214	176	177	192	205	159	166
10 female	264	270	213	203	230	249	196	209	260	259	219	213	225	251	191	204
3 male	179	181	163	162	163	177	152	162	187	194	173	172	154	178	154	164
5 male	123	127	110	109	109	130	100	118	131	125	125	113	113	121	100	103
6 male	116	107	112	101	110	119	96	100	115	110	108	104	106	115	100	102
8 male	171	165	153	145	162	167	138	148	156	149	158	158	150	164	136	144
9 male	123	128	117	105	117	127	120	116	117	127	120	116	96	120	103	112
score	1795	1787	1582	1520	1608	1771	1484	1562	1797	1784	1637	1596	1573	1739	1452	1531
mean	180	179	158	152	161	177	148	156	180	178	164	160	157	174	145	153
stdev	48	49	35	36	39	42	34	35	49	48	36	36	42	44	34	36

Note. This table presents the mean scores for fundamental frequency in stress clash contexts versus non-clash contexts when stress shifted (Y) or when stress did not shift (N). Results are also shown for the first (S1) and second syllable (S2) of target words in early-position and in late-position in stress clash contexts (SC1 and SC2) and in non-clash contexts (NC1 and NC2).

Table continues.

Acoustic Results

Duration Mean Scores (ms)

SUBJECT gender	STRESS CLASH CONTEXT								NON-CLASH CONTEXT							
	SHIFT (Y)				SHIFT (N)				SHIFT (Y)				SHIFT (N)			
	SC1		SC2		SC1		SC2		NC1		NC2		NC1		NC2	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
1 female	204	208	197	232	185	270	206	305	211	230	185	258	199	266	199	251
2 female	117	223	172	241	175	314	146	270	195	300	197	287	179	295	167	284
4 female	186	227	196	228	166	254	158	285	181	226	207	237	170	268	182	287
7 female	198	226	211	258	161	247	181	232	202	222	187	216	181	237	186	244
10 female	145	297	227	231	194	207	150	186	206	300	190	250	197	237	187	254
3 male	147	221	149	213	141	230	171	268	137	242	162	269	150	248	169	251
5 male	154	231	179	224	151	244	146	299	144	245	114	241	156	244	169	280
6 male	213	259	219	267	200	287	224	334	212	241	234	273	200	293	216	310
8 male	169	213	155	225	178	206	167	132	138	229	165	228	171	224	151	229
9 male	189	204	189	247	190	272	192	210	189	225	156	222	172	261	181	255
score	1722	2309	1894	2366	1741	2531	1741	2521	1815	2460	1797	2481	1775	2573	1807	2645
mean	172	231	189	237	174	253	174	252	182	246	180	248	178	257	181	265
stdev	31	28	26	17	19	34	27	62	30	30	33	23	17	24	18	25

Table continues.

Acoustic Results

Intensity Mean Scores (dB)

SUBJECT	STRESS CLASH CONTEXT								NON-CLASH CONTEXT							
	SHIFT (Y)				SHIFT (N)				SHIFT (Y)				SHIFT (N)			
	SC1		SC2		SC1		SC2		NC1		NC2		NC1		NC2	
gender	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
1 female	66	65	66	64	71	72	70	69	65	61	65	63	71	71	72	71
2 female	71	68	67	66	72	74	68	68	70	68	70	66	71	70	68	69
4 female	71	70	68	67	70	71	69	69	69	68	71	69	71	72	68	70
7 female	74	72	72	70	67	66	65	65	73	72	74	72	68	68	65	64
10 female	77	72	78	76	71	71	68	68	78	77	78	76	72	71	70	70
3 male	70	68	68	66	71	72	71	71	71	68	71	69	72	72	71	70
5 male	69	69	68	67	66	70	65	67	68	68	69	65	69	70	65	66
6 male	74	73	71	70	73	74	74	72	74	72	75	72	73	74	72	72
8 male	79	77	76	74	72	72	70	71	77	75	77	76	70	70	68	68
9 male	74	74	74	73	64	68	64	66	73	74	73	71	65	67	65	67
score	725	708	708	693	697	710	684	686	718	703	723	699	702	705	684	687
mean	73	71	71	69	70	71	68	69	72	70	72	70	70	71	68	69
stdev	4	3	4	4	3	2	3	2	4	5	4	4	2	2	3	2

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