

# Prosodic Differences between Comma, Colon, and Dash to Introduce

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## 紹介に用いるコンマ、コロン、ダッシュに見られる韻律特徴

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### 要 旨

事物を紹介する際に、英語では *comma*, *semicolon*, *dash* という句読記号が用いられるが、使用する記号は、その箇所でのポーズ長をはじめ、他の場所における諸韻律特徴に影響をもたらすのであろうか。その解明を目的として、英語の母語話者に、それぞれの記号を用いた英語文を発話してもらい、先行音節の最高ピッチ、先行音節の最大音圧、直前の音節の音調、記号の箇所のポーズ長、直後の音節の音調、後続音節の最高ピッチ、後続音節の最大音圧、記号の箇所のポーズ長を除いた他の音節の平均長を計測・比較した。その結果、ピッチに関しては、*semicolon* を用いた場合より *dash* を用いた方が先行音節の最高ピッチがより高くなった。また *only + one + 名詞* という語連続においては、*one* のピッチが他の項より高くなる傾向が現れた。音圧に関しては、記号の前後いずれにおいても有意差は生じず、使用する記号にかかわらず、話者は、適宜音圧を変化させながら、文全体を発話していることが判明した。音調については、いずれの記号の前後でも、下降調が圧倒的に好んで用いられた。記号の箇所におけるポーズ長については、*comma* の場合は最短となり、*semicolon* や *dash* との間に有意差が認められた一方、*semicolon* と *dash* の間には有意差は認められなかった。他方、各文よりポーズ長を除き、一音節に要する平均発話時間を比較すると、*comma* を用いた文で最長となり、これも *semicolon* や *dash* を用いた文との間に有意差が認められた一方、*semicolon* と *dash* を用いた文の音節間には有意差は認められなかった。つまり、*comma* の箇所のポーズ長とその文の音節長に関するこの相反する結果は、文レベルでの長さの補償の生起を示唆するものとなった。

## 1. Introduction

Punctuation is a system by which, through the use of certain marks, the meaning of written materials can be made clear or understood without any mistakes. In a preceding study on English punctuation marks conducted by the author, Ichizaki (1995), where eight kinds of marks were dealt with, a focus was placed on duration only out of various prosodic features, and the durational differences according to the usage of the marks were given with objective data. Shaw (1963) points out that all punctuation serves one of four general purposes: to terminate, to introduce, to separate, and to enclose. Among these four purposes it is introduction that utilizes the smallest number of marks to express the purpose. Only three of the marks are regularly used to introduce words or statements: commas, colons, and dashes. These three marks were made the target of the study, so as to obtain more detailed information. On the other hand, the prosodic features to study were expanded to pitch, pitch movement, tone, and sound pressure level in addition to duration in this research. What prosodic differences should hearers notice and discriminate between when speakers read out the written materials with the three marks? The answers would be the key to accomplish a successful communication and at the same time would be the target for those learning English to recognize and master.

## 2. Investigation and Analysis

### 2.1. Sentences for Analysis

Three kinds of sentences, with each having a different punctuation mark to introduce, were adopted as the sentences for an investigation. The sentences were as follows:

- (1) *Only one way is left, to succeed.*
- (2) *She had only one pleasure: drinking.*
- (3) *The only thing he cannot eat — carrots.*

The length of the sentences was short enough for speakers not to have inhalation during their utterances. The ratios of the number of the syllables which consist of the items preceding the mark and the items following the mark were 6 : 3 for sentence (1), 7 : 2 for sentence (2) and 8 : 2 for sentence (3), respectively.

### 2.2. Subjects

A total of ten native speakers of English served as subjects. All of them taught English conversation mainly at Japanese colleges. Their details are as follows:

Table 1-A Details of the Native Speakers of English

subject	sex	age	home region	register used (Hz)
J. C.	f	30	California, USA	108—280
D. S.	f	30	California, USA	142—340
E. O.	f	35	Indiana, USA	120—355
C. S.	f	38	New York, USA	67—271
L. S.	f	48	Connecticut, USA	87—340
J. A.	m	28	Hawaii, USA	83—192
S. B.	m	34	Oregon, USA	77—190
S. S.	m	44	Colorado, USA	98—216
S. D.	m	53	New Mexico, USA	81—197
R. B.	m	50	Somerset, England	55—161

### 2.3. Procedure

The subjects were shown the above phonetic materials and were asked to pronounce them three times for each sentence with the speed and natural manner of their daily speech. Their utterances were recorded onto mini-disk. After the recording their utterances were played and they were asked to choose the one utterance out of three that sounded most natural to their ears, and then the chosen utterance was adopted for the analysis using sound analyzing software called *SUGI Speech Analyzer* (Sugitō, 2000). The items measured and identified were: the highest pitch in the items preceding the mark, the greatest sound pressure level in the items preceding the mark, tones of the items adjacent to the mark, the duration of pause at the mark, the highest pitch in the items following the mark, the greatest sound pressure level in the items following the mark, and the averaged duration of a syllable. Referring to Winer (1972) the investigation was a single-factor experiment having repeated measures on the same elements. As described by Kirk (1982), analysis of variance for the experiment and multiple comparison test, Tukey (a) procedure/the HSD (the honestly significant difference) test, were carried out to check if there is a significant difference between the items measured.

### 3. Results and Remarks

The results of the measurement of the sentences (1), (2), and (3) are shown in Table 2-1, 2-2, and 2-3, respectively, in the appendix at the end of this paper. The sound pressure level analyzed with *SUGI Speech Analyzer* was represented in the range of  $-60\text{dB}$  to  $0\text{dB}$  on the display. Since there was always some noise made by the personal computer when analyzing, the range of  $10\text{dB}$  was reckoned for the noise. Therefore, not  $-60\text{dB}$  but  $-50\text{dB}$  was recognized as the minimum value of sound pressure level of every subject and the value with minus was converted to the value with plus by adding the displayed value with minus to the tentative maximum value  $50\text{dB}$  for convenience. The results of the items identified and measured will be discussed here, starting with the subjects number, proceeding from left to right in the tables.

### 3.1 The item/syllable, preceding the mark, having the highest pitch

Six subjects out of ten made *one* the highest, one subject made *Only* and *one* equally the highest, and another subject made *Only*, another made *way*, and the other made *left* the highest in material (1). In material (2), *She* and *one* respectively became the highest in the utterance of four speakers and the first and the second syllable of *only* respectively became the highest in the utterance of one speaker. A comparatively high pitch was noticed at the beginning *She*, although *she* is a function word that is not usually given prominence. It might substantiate the claim, which has been long indicated by phoneticians, that Americans tend to start their speech with a relatively high pitch. In material (3) eight subjects made *only* their highest item but there was divergence about which syllable they made the peak. Five subjects out of the eight made the second syllable of *only* the highest, two made the first syllable of the item the highest, and the other subject made the gliding part of the first and the second syllable the highest. The remaining two subjects out of ten made *eat* their peak item. The distance between the item and the punctuation mark seems to have nothing to do with which item becomes the highest. Rather than the position of the item, semantic value of the item would be the key to decide its pitch. There was the collocation of *only + one + (noun)* in material (1) and (2) and a relatively higher pitch at *one* was noticed in both materials. The analysis of variance of a single-factor experiment having repeated measures on the same elements, in the difference between the highest pitches of the preceding words in each material, showed a significant difference both between the context conditions and between the subjects ( $F=5.21$ ,  $df=2/18$ ,  $p<.05$ ;  $F=20.44$ ,  $df=9/18$ ,  $p<.001$ , respectively). Multiple comparison resulted in a significant difference between material (2), the sentence having a semicolon, and material (3), the sentence having a dash ( $p<.05$ ).

### 3.2 The item/syllable, preceding the mark, having the greatest sound pressure level

In material (1) a pressure priority at *one* was noticed as was mentioned in the previous section. Four subjects put their greatest values on *one*, two subjects put them on *Only*, one subject put it on *way* and *left* respectively and another put the greatest value evenly on *Only* and *one*, and the other put the even value on *Only one way*. In material (2), however, there was no priority at all in the placement of sound pressure. Two subjects gave *She*, *had*, *one*, and *pleasure* their greatest values respectively, one subject had a combined greatest pressure at *She* and *had*, and the other subject also had a combined greatest value at *She* and *pleasure*. In material (3) some priority was found at *only* and *thing*. Three subjects put their greatest pressure at the former while four subjects did it at the latter. The remaining three subjects had a combined greatest pressure: one had it at *only* and *thing*, another at *only* and *cannot*, and the other at *thing* and *eat*. In the difference between the maximum sound pressure levels of the preceding words in each material, the analysis of variance showed no significant difference either between the context conditions or between the subjects ( $F=1.44$ ,  $df=2/18$ , ns;  $F=1.03$ ,  $df=9/18$ , ns, respectively).

### 3.3 Tones of the syllable preceding and following each punctuation mark

Looking at tone patterns used for the syllable preceding each punctuation mark, falling tone was overwhelmingly preferred in each of the sentences: nine subjects used it in material (1), all ten subjects did

it in (2), and seven subjects did it in (3). The exceptional one subject in (1) used a rise-fall tone and the remaining three subjects in (3) used two rising tones and a level tone. The overwhelming preference of falling was found at the syllable following each punctuation mark, too. This seems to be a natural result, since all materials were affirmative sentences and the syllable following the mark was the last item or a syllable belonging to the last tone unit of the sentence. All subjects used it in material (1) and (3) and eight subjects used it in (2). The exceptional two subjects in (2) used a rise-fall tone.

### 3.4 Duration of pause at the comma, the semicolon, and the dash

As the result of statistical analysis concerning the duration of pause, a significant difference was recognized both between the context conditions and between the subjects by the analysis of variance ( $F=10.22$ ,  $df=2/18$ ,  $p<.01$ ;  $F=2.88$ ,  $df=9/18$ ,  $p<.05$ , respectively). Multiple comparison resulted in a significant difference between material (1), the sentence having a comma, and material (2), the sentence having a semicolon, and between material (1), the sentence having a comma, and material (3), the sentence having a dash ( $p<.05$ ;  $p<.01$ , respectively). As each sentence had a different duration, the ratio of the duration of pause to the duration of whole sentence was taken for each material and the same statistical procedure was conducted, just to be sure. Although the values obtained were different, similar results appeared. A significant difference was recognized between the context conditions and there was a tendency of difference between the subjects by the analysis of variance ( $F=11.58$ ,  $df=2/18$ ,  $p<.01$ ;  $F=2.23$ ,  $df=9/18$ ,  $p<.10$ , respectively). Multiple comparison resulted in a significant difference between material (1) and material (2) and between material (1) and material (3) ( $p<.01$ ;  $p<.01$ , respectively).

### 3.5 The item/syllable, following the mark, having the highest pitch

In material (1) three subjects gave *to* their highest pitches and seven subjects gave them to *succeed*. There was divergence about which syllable was made to be the highest for *succeed*. Two subjects made the first syllable of *succeed* the highest while five made the second syllable. As there was only one item/syllable after the semicolon in material (2), no discussion is done concerning the number of subjects here. In material (3) all subjects made the first syllable of *carrots* the highest. There was no significant difference between the context conditions but there was a significant difference between the subjects by the analysis of variance ( $F=1.70$ ,  $df=2/18$ , ns;  $F=34.79$ ,  $df=9/18$ ,  $p<.001$ , respectively). Multiple comparison resulted in no significant difference between any of the sentences.

### 3.6 The item/syllable, following the mark, having the greatest sound pressure level

In material (1) nine subjects gave *succeed* their greatest pressure. Five of the nine gave the first syllable their greatest pressure, two subjects made the second syllable maximum, and the other two made both syllables equal. The remaining one subject out of ten gave *to* and the second syllable of *succeed* the even greatest pressure. No discussion is done concerning the number of subjects in material (2) here for the same reason as in the previous section. In material (3) six subjects made the first syllable of *carrots* maximum while four subjects made the second syllable maximum. No significant difference was noticed between the context

conditions but there was a significant difference between the subjects by the analysis of variance ( $F=2.40$ ,  $df=2/18$ , ns;  $F=5.10$ ,  $df=9/18$ ,  $p<.01$ , respectively). Multiple comparison resulted in no significant difference between any of the sentences.

### 3.7 The averaged duration of a syllable

In order to check if the mark had influenced the duration of each segment, the average duration of a syllable for each sentence was obtained and compared with each other. The duration of the mark was taken away from the duration of the whole sentence and the value was divided by the number of syllables in the whole sentence. Material (1) and (2) consisted of nine syllables while material (3) consisted of ten syllables. The averaged duration of a syllable in material (1), (2), and (3) was 252ms, 222ms, and 220ms, respectively. In the comparison between three averaged values for each subject, nine subjects out of ten made the value in material (1) the longest. As the result of statistical procedure, a significant difference was recognized both between the context conditions and between the subjects by the analysis of variance ( $F=18.00$ ,  $df=2/18$ ,  $p<.001$ ;  $F=10.84$ ,  $df=9/18$ ,  $p<.001$ , respectively). Multiple comparison resulted in a significant difference between material (1) and material (2) and between material (1) and material (3) ( $p<.01$ ;  $p<.01$ , respectively).

## 4. Conclusion

On the whole, concerning pitch and sound pressure level, just a little difference was found in the pitch before the mark and no other difference was found at all in any other analysis. The only significant difference was noticed in the higher pitch at that position in the sentence having a dash than in the sentence having a semicolon. Regarding the sound pressure level, nonsignificant difference both between the context condition and between the subjects indicated that any speaker seemed to have a fixed maximum intensity in any sentence irrespective of which mark was used. Although no statistical test was employed, the pitch of *one* tended to be higher than the pitch of the other items in the collocation of *only + one + (noun)*. For tones at the syllable preceding the mark, falling was most preferred for any mark. As for duration of the mark, the shortest duration was given to the comma, which produced a significant difference between the comma and the semicolon and between the comma and the dash, while there was no significant difference between the semicolon and the dash. Conversely, the longest duration was given to the syllables which appeared in the sentence having the comma, which resulted in a significant difference between the sentence having the comma and that having the semicolon and between that having the comma and that having the dash, while no significant difference was noticed between the syllables in the sentence having the semicolon and those in the sentence having the dash. The two opposite results found between the duration of the comma and the syllables in the sentence having the comma might suggest that there is a temporal compensation at sentence level. The least attention to the comma might have produced the shortest duration at the mark and have given the longest duration to the syllables making up the sentence so as to keep a fixed duration for the whole sentence irrespective of the mark used. More data with different conditions is necessary and inevitable to substantiate this assumption and that is the next step to take for the present research.

## References

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- [3] H. Shaw. *Punctuate It Right!*. 8th pr. with rev., New York, Harper & Row, 1983.
- [4] M. Sugitō. *SUGI Speech Analyzer CD-ROM*, Yokohama: Animo, 2000.
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## Appendix

Table 2-1 Prosodic Data of Sentence (1): *Only one way is left, to succeed.*

The abbreviated titles in this and the following tables are as follows: "Hp of pr" is the highest pitch of the preceding syllables to the mark, "Mp of pr" is the maximum sound pressure level of the preceding syllables to the mark, "T of pr" is the tone of the preceding syllable to the mark, "D of pause" is the duration of the pause at the mark, "R of D to W" is the rate of the duration of the pause mentioned left to the duration of the whole sentence, "T of ff" is the tone of the following syllable to the mark, "Hp of ff" is the highest pitch of the following syllables to the mark, "Mp of ff" is the maximum sound pressure level of the following syllables to the mark, and "Av D of sy" is the averaged duration of a syllable in the sentence.

subjects	Hp of pr	Mp of pr	T of pr	D of pause	R of D to W	T of ff	Hp of ff	Mp of ff	Av D of sy
J. C.	275	38	falling	278	10.2	falling	219	30	273
D. S.	340	40	falling	329	11.8	falling	246	35	273
A. O.	296	41	falling	146	6.9	falling	192	37	218
C. S.	271	38	falling	531	20.2	falling	168	34	232
L. S.	219	41	falling	177	8.2	falling	188	41	220
J. A.	153	39	falling	237	10.0	falling	105	40	237
S. B.	145	42	rise-fall	289	11.4	falling	129	33	249
S. S.	168	37	falling	607	21.0	falling	146	34	254
S. V.	161	40	falling	412	14.0	falling	126	31	281
R. B.	161	39	falling	481	15.8	falling	111	38	285
average	219	39.5		349	13.3		163	35.3	252
SD	71	1.6		154	4.8		48	3.7	25

Table 2-2 Prosodic Data of Sentence (2): *She had only one pleasure; drinking.*

subjects	Hp of pr	Mp of pr	T of pr	D of pause	R of D to W	T of ff	Hp of ff	Mp of ff	Av D of sy
J. C.	238	39	falling	592	20.1	falling	200	31	261
D. S.	313	37	falling	512	19.5	falling	225	32	234
A. O.	347	42	falling	598	26.1	falling	231	38	188
C. S.	225	34	falling	445	19.4	falling	139	30	206
L. S.	225	36	falling	412	18.9	falling	200	40	196
J. A.	153	33	falling	345	13.8	falling	108	27	239
S. B.	181	45	falling	708	30.3	falling	96	30	181
S. S.	164	46	falling	435	18.2	falling	123	36	217
S. V.	158	38	falling	477	18.2	rise-fall	129	33	238
R. B.	150	38	falling	666	22.4	rise-fall	94	33	256
average	215	39		519	20.6		155	33.0	222
SD	69	4.3		118	4.6		54	4.0	28

Table 2-3 Prosodic Data of Sentence (3): *The only thing he cannot eat — carrots.*

subjects	Hp of pr	Mp of pr	T of pr	D of pause	R of D to W	T of ff	Hp of ff	Mp of ff	Av D of sy
J. C.	285	33	falling	558	18.3	falling	177	31	249
D. S.	313	39	falling	713	21.8	falling	225	36	257
A. O.	355	41	falling	424	19.0	falling	210	38	181
C. S.	271	36	falling	575	20.6	falling	149	32	222
L. S.	340	41	rising	297	14.6	falling	195	43	174
J. A.	192	36	falling	341	13.1	falling	108	35	226
S. B.	190	35	rising	928	33.5	falling	112	33	185
S. S.	216	34	falling	671	21.5	falling	111	32	245
S. V.	192	39	falling	692	23.2	falling	110	32	229
R. B.	141	38	level	779	24.8	falling	122	36	236
average	250	37		598	21.3		152	34.8	220
SD	73	2.8		199	5.7		46	3.7	30