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Determining the Energies of Names (Revised Version)

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Abstract

This article is a revised version of an article with the same title that was published by the author in 2006, and it corrects errors that are present in the previous version. A method is presented for determining the energy of a name as the acoustical energy of the vocalized name. The names, Madonna and Esther, as spoken by the author and by a computerized text-to-speech program, were used to test the method. Differences between the acoustical energies of the two names depended upon the method used to measure the energies. There was no difference between the energies of the names as spoken by the author, but when the names were vocalized with a computerized text-to-speech program, Madonna had 2.6-fold greater energy than Esther.

Introduction

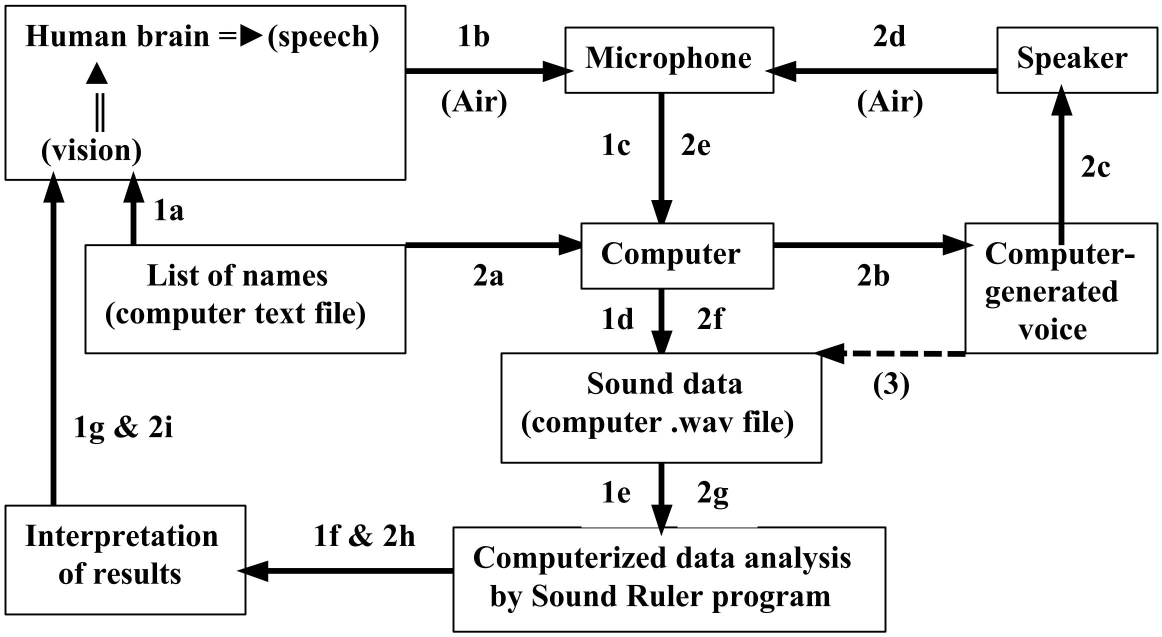
On June 16, 2004, the pop singer, Madonna, announced that she had taken the Hebrew name of Esther, in order to attach herself to "the energy of a different name" [1]. Nameologist, Maryanna Korwitts, has written that "...every name carries a frequency or vibration established by the characters that make up the name." and that "...the creative (or discordant) energy of a name is released every time that name is spoken, written or even thought." [2]. To the natural scientist, these statements about energy can have physical interpretations. Scientists ascribe different types of energies to different objects and actions of the natural world, such as mechanical energy, heat energy, electrical energy, atomic energy, etc. Do different names have different "energies" in the scientific sense of the word? Is it possible that the physical parameter, energy, has a role in the choice of names, and, if so, how could the energies of names be determined?

The physiological processes of thought, speech, hearing, writing, and vision involve complex brain and muscular activities. All of these processes are known, or believed, to have a biochemical basis, and associated energies that can be measured and described with physical parameters. The transmission of speech between humans through the medium of air begins with compressions of air by the lungs and vocal cords, propagation of these compressions through air in the form of waves, reception of the compressions by the human ear, conversion of the compressions into vibrations of the ear drum, and, finally, conversion of ear drum vibrations into the electrical and chemical energy of nerve impulses by the apparatus of the inner ear. If the human ear is replaced with an electronic reception device, such as a microphone and recording device, it is possible to measure the acoustical energy associated with speech, such as spoken names. This methodology enables the comparison of the energies of names, in terms of their acoustical energies.

Methods

The names, Madonna and Esther, were vocalized by two methods, and the resulting sounds were recorded electronically (Figure 1). The first method involved vocalization of the names by the author. A human sound source may unintentionally introduce bias into the manner in which a name is vocalized. For example, the speaker may emphasize certain parts of a name, or emphasize one name more than another. One way to avoid such bias would be to use computer generated speech as the means of vocalization, as it permits control of many aspects of the speech process and should make it possible to generate identical vocalizations of the same name. Therefore, the names were also vocalized by a computerized text-to-speech program. Regardless of the method

Figure 1. Diagram of the flow of information in these experiments. Steps 1a-d involved generation of a computer sound/audio file from human speech, whereas steps 2a-2f involved generation of a sound/audio file by use of a computerized text-to-speech program. Although it is possible to directly convert a list of names to a sound file via steps 2a → 2b → 3, this method was not used as it eliminates the use of air as the carrier medium for sound.



of sound generation, each name was vocalized three times so that subsequent energy analysis would provide an average energy for each name. The sound generating and recording equipment included a Radio Shack (Fort Worth, TX) multimedia headset with omnidirectional boom microphone (100-10,000 Hz frequency response; -40 dB ±5 dB sensitivity) attached to a Gateway computer (Intel Celeron 2.0 GHz CPU, 640 MB RAM) with a Microsoft® Windows XP, Home Edition, Version 2002, operating system. For human speech, an attempt was made to maintain the same position of the microphone with respect to the sound source, and the same volume of speech for each spoken name. For computer generated speech, the names, Madonna and Esther, were typed into a Microsoft® Word 2002 document to create a text file. The Microsoft® text to speech program was then used, with the LH Michelle voice, to generate audio sound from the text file. The speed of speech was set to 25% of maximal, and all audio outputs were maximal. The recording microphone, which was attached to the same computer, was placed 3 cm from the computer's speaker, a 7 cm diameter, Creative GCS300, Model SBS36B (Cambridge Sound Works, Andover, MA), and positioned pointing toward the center of the speaker. The computer generated speech was then recorded by the same computer, and the recording was converted into a sound/audio file (i.e., steps 2a-2f of Figure 1). The sound file was then analyzed using the acoustical analysis program, Sound Ruler (MS Windows, Version 0.9.4.1) and default values for all variables in the program [3]. The speaker volume was adjusted to give unambiguous measurements when analyzed by the Sound Ruler program, and kept at a constant volume level for the computer generated vocalization of all names.

Sound waves cause the diaphragm of a microphone to oscillate back and forth, and this motion is converted into an oscillating electrical signal which is then recorded. The Sound Ruler program converts the recorded electronic signal into a graph of voltage variations with time, or oscillogram [4]. Since sound waves, and the electrical signals obtained from them, oscillate around zero amplitude, an average of the amplitudes of voltage peaks in the oscillogram over time would lead to a cancellation of the negative and positive peaks. Instead, the Sound Ruler program uses root mean square (RMS) values as an approximation of the mean voltage of a sound. RMS is the square root of the mean of the squared voltage values:

$$RMS = \sqrt{[\Sigma(\text{voltage value}^2)]/\text{number of values}]}; \text{ units = volts (V)}$$

Sound Ruler then calculates an energy value for each of 8 segments (sound slices) of the oscillogram: 0 to 10%, 10 to 50%, 50 to 90%, and 90% to the peak amplitude (all before the peak amplitude), and peak to 90%, 90 to 50%, 50 to 10%, and 10 to 0% (all after the peak amplitude). The energy value for each sound slice is determined by squaring the RMS value and multiplying the result by the time duration of the slice:

$$\text{Energy} = (RMS^2) \times (\text{time}); \text{ units = volts}^2 \times \text{seconds } (V^2 \bullet s)$$

The energies of each sound slice were then added by the author to obtain a total energy for the sound: Total Energy = Σ (Energy for sound slice); units = volts^2 x seconds ($V^2 \bullet s$)

Theoretically, it is possible to directly convert the names in the text file to a sound file without using a speaker and microphone (i.e., steps 2a → 2b → 3 of Figure 1), which perhaps would simulate the process whereby a human thinks of a name without vocalizing the name, thereby eliminating the intervening medium of air. However, for the sake of trying to duplicate as closely as possible the real world situation of hearing a spoken name, the experiments involving computer generated speech utilized a speaker (i.e., simulated human voice), microphone (i.e., simulated human ear), and air (i.e., the compressible medium between mouth and ear).

All calculations of energy data were done using the Microsoft® Excel 2002 program.

Results

Figure 2 shows the oscillogram plot obtained from vocalization of the names, Madonna and Esther, by the author. Figures 3 and 4 are expanded versions of the second vocalization for each name, and show the detailed structure of each vocalization. As commonly vocalized by humans, the name, Madonna, consists of three syllables (Ma-don-na), and the name, Esther, consist of two syllables (Es-ther). In Figures 2 and 3, it is apparent that syllables one and two of Madonna are clearly separated, but the separation between syllables two and three is not distinct. Although Esther consists of two syllables, Figures 2 and 4 show that the speed of recording is so rapid that it appears as though the name contains three syllables, with a partial separation between syllables one and two and a distinct separation between syllables two and three.

Figure 5 shows oscillogram plots obtained from computer generated vocalizations of the names, Madonna and Esther. Figures 6 and 7 show expanded versions of the second vocalization of each name. One surprising result of this part of the experiment was the finding that each computer generated vocalization of the same name was not identical, as can be seen by careful inspection of Figure 5. The reason for this result is unknown. As expected, the Esther vocalization contained two syllables (Figure 7), but the Madonna vocalization (Figure 6) consisted of two, instead of the expected three, syllables. Again, the reason for this is unknown, as the computer generated vocalizations of each name sounded normal to the author.

In the previous version of this article [5], energy analysis was done incorrectly, with the entire vocalization of a name treated as one syllable. For the experiments described herein, energy analysis was done on each syllable, real or apparent, of a vocalization, and then the syllable energies were combined to obtain an overall acoustic energy for the name. The overall energies for three vocalization were then averaged to obtain an average acoustic energy for each name. Tables 1 and 2 show the results of energy analyses for the names, Madonna and Esther, as spoken by the author. The average energy (± std. dev.) for Madonna was 4.88 (± 1.20) $V^2 \bullet s$, and for Esther was 4.16 (± 0.41) $V^2 \bullet s$. Therefore, there is no difference between the energies of these two names as spoken by the author. Tables 3 and 4 show the results of energy analyses for computer generated vocalizations of Madonna and Esther. The average energy for Madonna was 13.10 (± 2.37) $V^2 \bullet s$, and for Esther was 4.95 (± 0.23) $V^2 \bullet s$. Therefore, when vocalized by the computer's text-to-speech program, Madonna has 2.6-fold greater energy than Esther. Table 5 summarizes the results. The results obtained in these experiments are in contrast with the result obtained in the previous version of this article, where Esther was found to have greater energy than Madonna, as vocalized by the author.

Conclusions

Methodology exists for the determination of at least one facet of name energy, the acoustical energy of spoken names. Differences in the acoustical energies of names apparently depends upon the method used to generate the name vocalization. In these experiments, there was no difference in the acoustic energies of the names, Madonna and Esther, as spoken by the author, but a 2.6-fold difference in the acoustic energies of these names, with Madonna having the greater energy, when the vocalizations were generated by a computerized text-to-speech program.

Acknowledgements

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The author thanks Dr. Marcos Gridi-Papp, of the Department of Physiological Science, University of California at Los Angeles, inventor of the Sound Ruler program, for assistance in interpreting results obtained with the program.

References

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2. Korwitts, M., Name Structures: First Name Report Cards (http://www.namepower101.com/fname_report_cards.php).
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4. Gridi-Papp, M. Personal communication, October 25, 2006.
5. Previous version of this article: Wade, D. Determining the energies of names. Wade Res. Found. Rep. (2006) 2: 1-3. (http://wade-research.com/images/Name_Energy_05-08-06_.pdf)
6. The acoustic (.wav) files used in these experiments are available upon request to the author [File sizes: author's voice (Madonna and Esther, 135 kb); computer generated speech (Madonna, 194 kb; Esther, 146 kb)].

Figure 2. Oscillogram plot for vocalization of the names, Madonna and Esther, by the author. The names were spoken in succession, and each name was spoken three times. The amplitude patterns are similar, but not exact, for each vocalization. Madonna consists of three syllables (Ma-don-na), and this is apparent from the figure. Syllables one and two are clearly separated, but the separation between syllables two and three is not distinct. Esther consists of two syllables (Es-ther), but the speed of recording is so rapid that it appears as though the name contains three syllables, with partial separation between syllables one and two and distinct separation between syllables two and three.

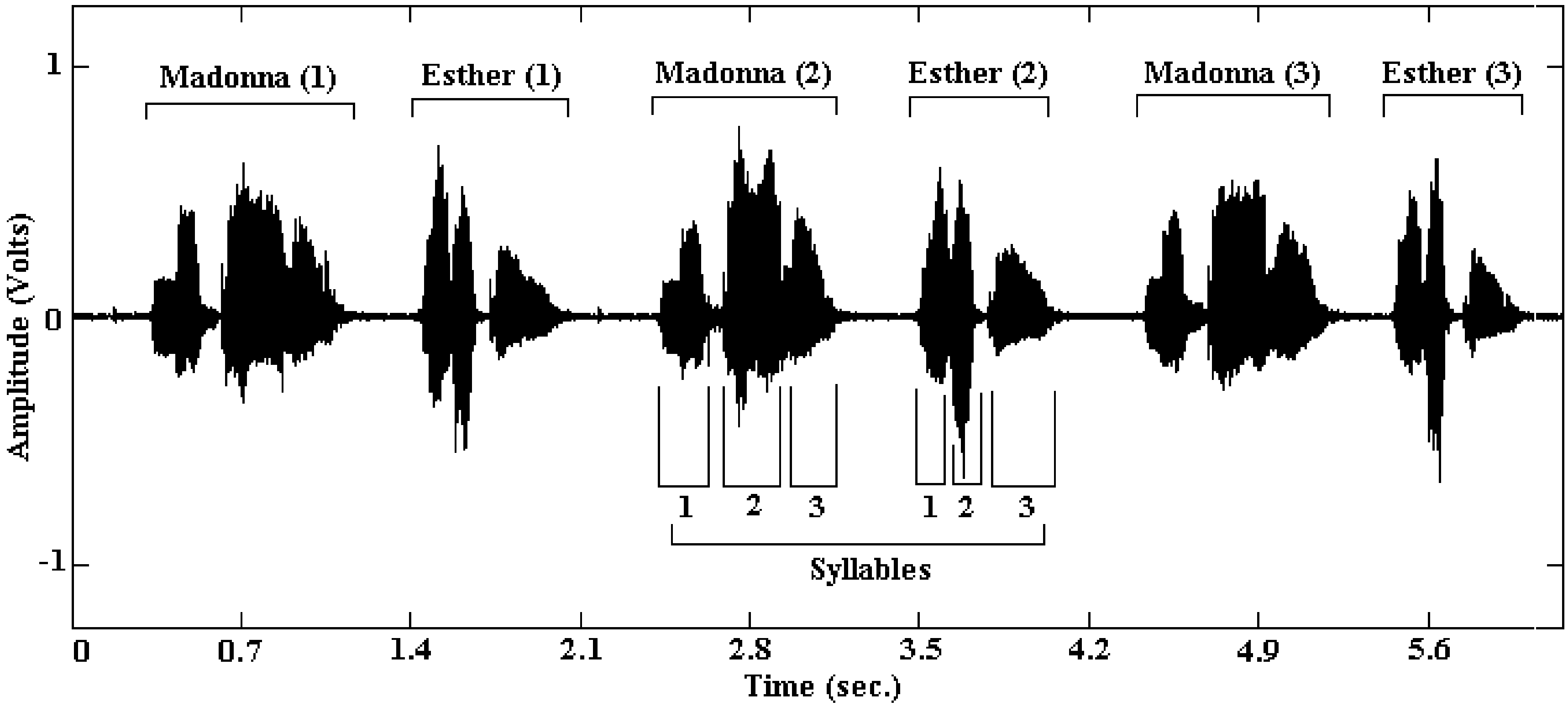

Figure 3. Expanded version of the oscillogram plot for the second vocalization of the name, Madonna, as spoken by the author, from Figure 2.

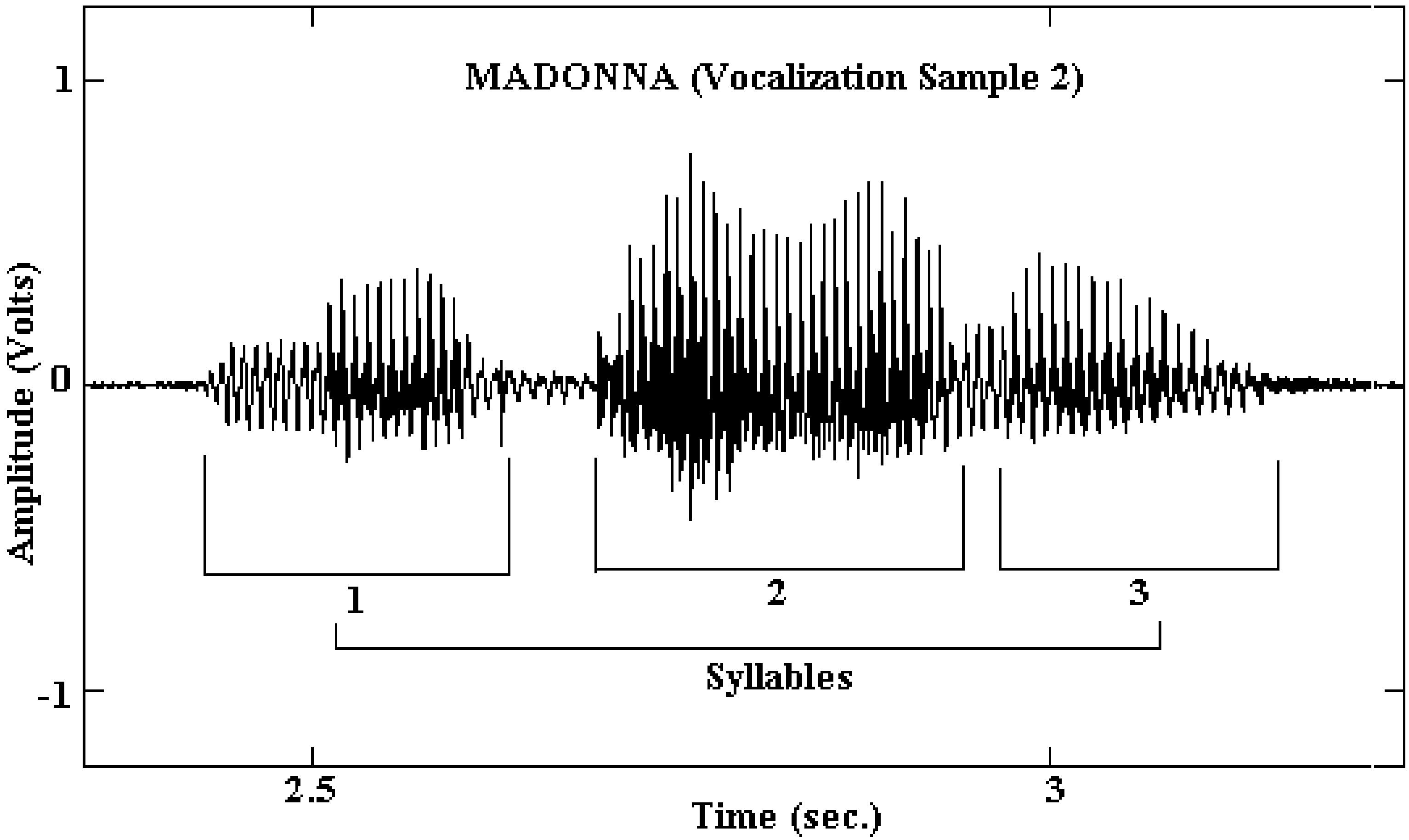

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Figure 4. Expanded version of the oscillogram plot for the second vocalization of the name, Esther, as spoken by the author, from Figure 2.

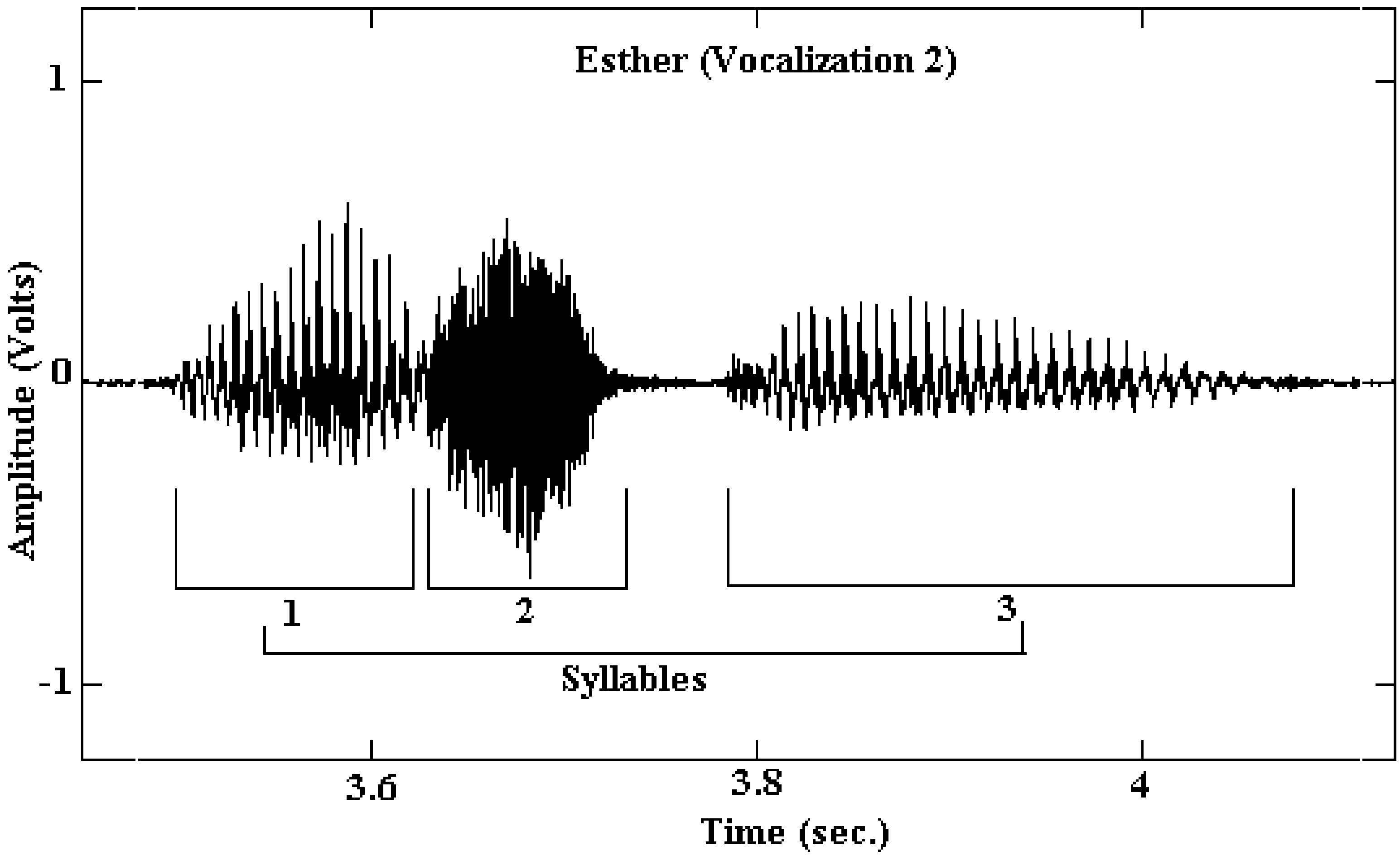

Table 1. Energy analyses for author vocalizations of the name, Madonna.

Name (Sample No.)	Oscillogram Section	Syllable 1	Syllable 2	Syllable 3	Total Σ (V^2 •s)
Madonna (1)	Ener_0-10_Beg	0.00047969	0	0	
	Ener_10-50_Beg	0.69049	0.93164	0	
	Ener_50-90_Beg	0.43008	0.0005397	0.63915	
	Ener_90-Peak_Beg	0.058165	0.043534	0.028681	
	Ener_Peak-90_End	0.080922	0.085871	0.059537	
	Ener_90-50_End	0.98535	0.04054	0.51999	
	Ener_50-10_End	0.064257	0.058055	0.30926	
	Ener_10-0_End	0.00034333	0	0.0004543	
	Sample 1 Σ:	Σ = 2.31	Σ = 1.16	Σ = 1.56	Σ = 5.03
Madonna (2)	Ener_0-10_Beg	0.00048981	0.0013593	0	
	Ener_10-50_Beg	0.014489	1.2233	0	
	Ener_50-90_Beg	1.2091	0.0060501	0.58199	
	Ener_90-Peak_Beg	0.042802	0.093632	0.025112	
	Ener_Peak-90_End	0.045493	0.13067	0.061028	
	Ener_90-50_End	0.36781	0.11728	0.58262	
	Ener_50-10_End	0.083077	1.1357	0.27798	
	Ener_10-0_End	0	0.0016213	0.00025574	
	Sample 2 Σ:	Σ = 1.76	Σ = 2.71	Σ = 1.53	Σ = 6.00
Madonna (3)	Ener_0-10_Beg	0.0006219	0	0	
	Ener_10-50_Beg	0.022427	0.08146	0	
	Ener_50-90_Beg	1.1046	0.011836	0	
	Ener_90-Peak_Beg	0.05055	0.013946	0	
	Ener_Peak-90_End	0.059928	0.024887	0.066071	
	Ener_90-50_End	0.45738	0	1.5116	
	Ener_50-10_End	0.081249	0	0.13083	
	Ener_10-0_End	0	0	0.0014566	
	Sample 3 Σ:	Σ = 1.78	Σ = 0.13	Σ = 1.71	Σ = 3.62
Avg (± Std Dev)					4.88 (± 1.20)

Table 2. Energy analyses for author vocalizations of the name, Esther.

Name (Sample No.)	Oscillogram Section	Syllable 1	Syllable 2	Syllable 3	Total Σ (V^2 •s)
Esther (1)	Ener_0-10_Beg	0.00023532	0.00092623	0	
	Ener_10-50_Beg	1.2196	0.10314	0.022463	
	Ener_50-90_Beg	0.0053096	0.010394	0.20534	
	Ener_90-Peak_Beg	0.11298	0.034615	0.020109	
	Ener_Peak-90_End	0.059584	0.030778	0.043974	
	Ener_90-50_End	0.084903	0.0054206	0.5216	
	Ener_50-10_End	1.0807	0.044992	0.27797	
	Ener_10-0_End	0.00045601	0.0001305	0.00017411	
	Sample 1 Σ:	Σ = 2.56	Σ = 0.23	Σ = 1.09	Σ = 3.89
Esther (2)	Ener_0-10_Beg	0.00049062	0.00011159	0.00015733	
	Ener_10-50_Beg	1.2258	0.72604	0.017833	
	Ener_50-90_Beg	0.00373	0.018169	0.52354	
	Ener_90-Peak_Beg	0.072661	0.012694	0.015433	
	Ener_Peak-90_End	0.075856	0.014812	0.034666	
	Ener_90-50_End	0.0421	0.006691	0.28339	
	Ener_50-10_End	0.63946	0.054942	0.1959	
	Ener_10-0_End	0	0	0.00027683	
	Sample 2 Σ:	Σ = 2.06	Σ = 0.83	Σ = 1.07	Σ = 4.96
Esther (3)	Ener_0-10_Beg	0	0.00063267	0	
	Ener_10-50_Beg	0.46675	2.0903	0.013704	
	Ener_50-90_Beg	0.0006345	0.075426	0.15204	
	Ener_90-Peak_Beg	0.033816	0.03473	0.018813	
	Ener_Peak-90_End	0.049956	0.027583	0.035738	
	Ener_90-50_End	0.032775	0.049715	0.15047	
	Ener_50-10_End	0.90057	0.21059	0.28858	
	Ener_10-0_End	0	0.00024523	0.00018432	
	Sample 3 Σ	Σ = 1.48	Σ = 2.49	Σ = 0.66	Σ = 4.63
Avg (± Std Dev)					4.16 (± 0.41)

Figure 5. Oscillogram plots for vocalization of the names, Madonna (left) and Esther (right), as generated by a computerized text-to-speech program. These computer vocalizations were generated as groups of three of the same name, as opposed to alternating between names as was done for author generated speech (compare with Figure 2). It was assumed that each vocalization of computer generated speech would be identical. However, close examination of the figures reveals that each vocalization of the name, while very similar, was not identical.

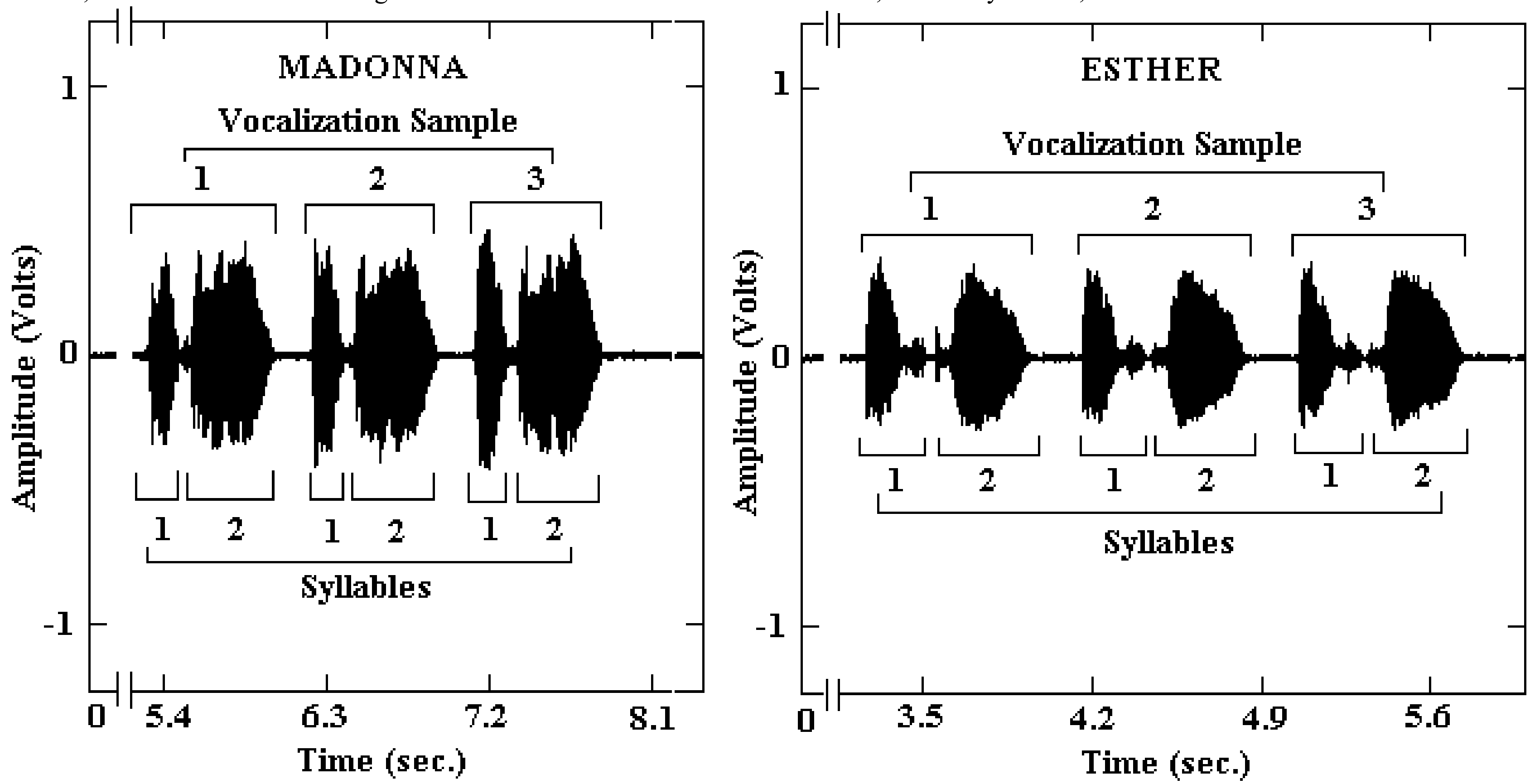

Figure 6. Expanded version of the oscillogram plot for the second computer generated vocalization of the name, Madonna, from Figure 5. Unlike the author's vocalization of Madonna (Figures 2 and 3), the computer vocalized name appears to be composed of only two syllables (Ma-donna).

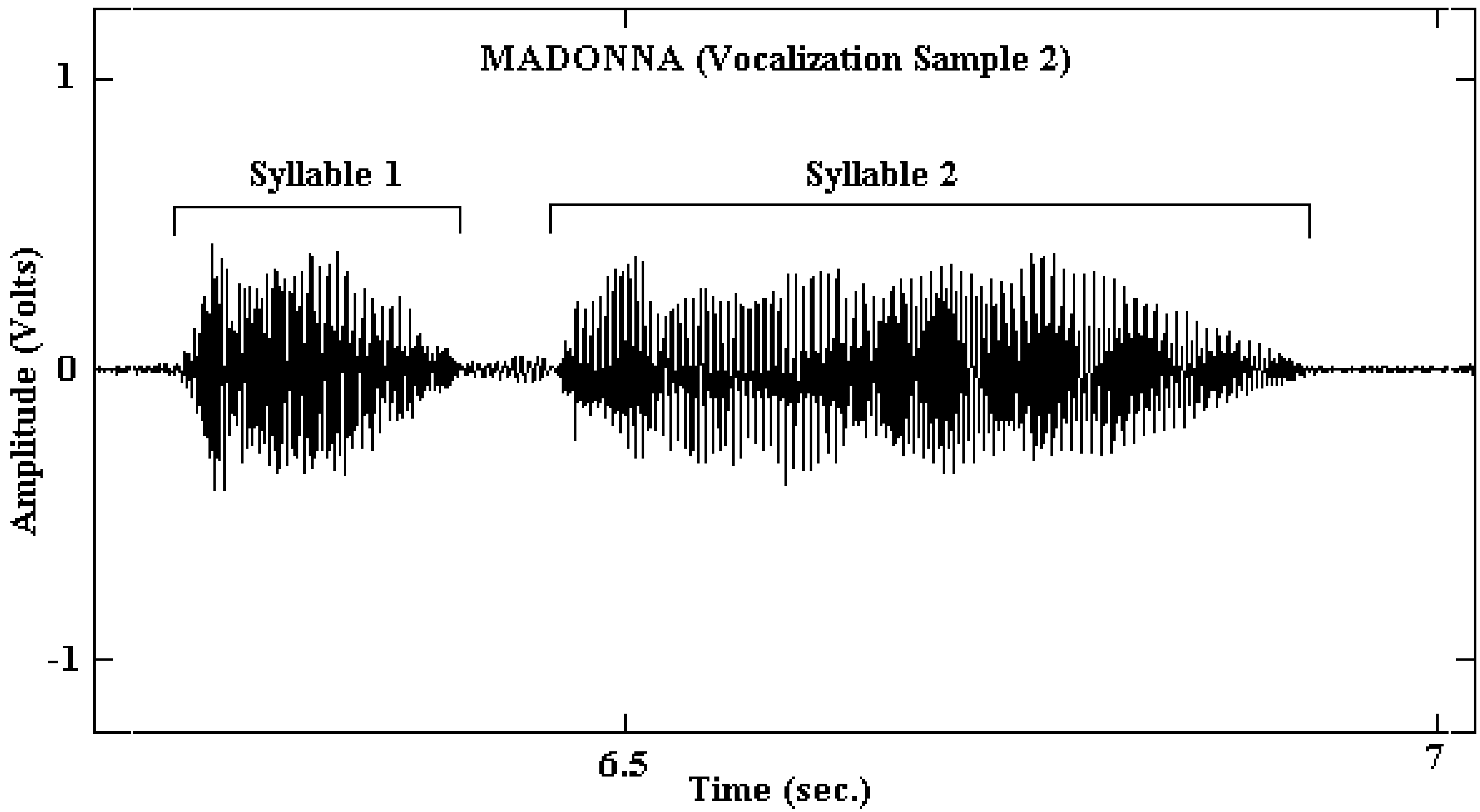

Figure 7. Expanded version of the oscillogram plot for the second computer generated vocalization of the name, Esther, from Figure 5. Unlike the author's vocalization of Esther (Figures 2 and 4), the computer vocalized name appears to be composed of only two syllables (Es-ther).

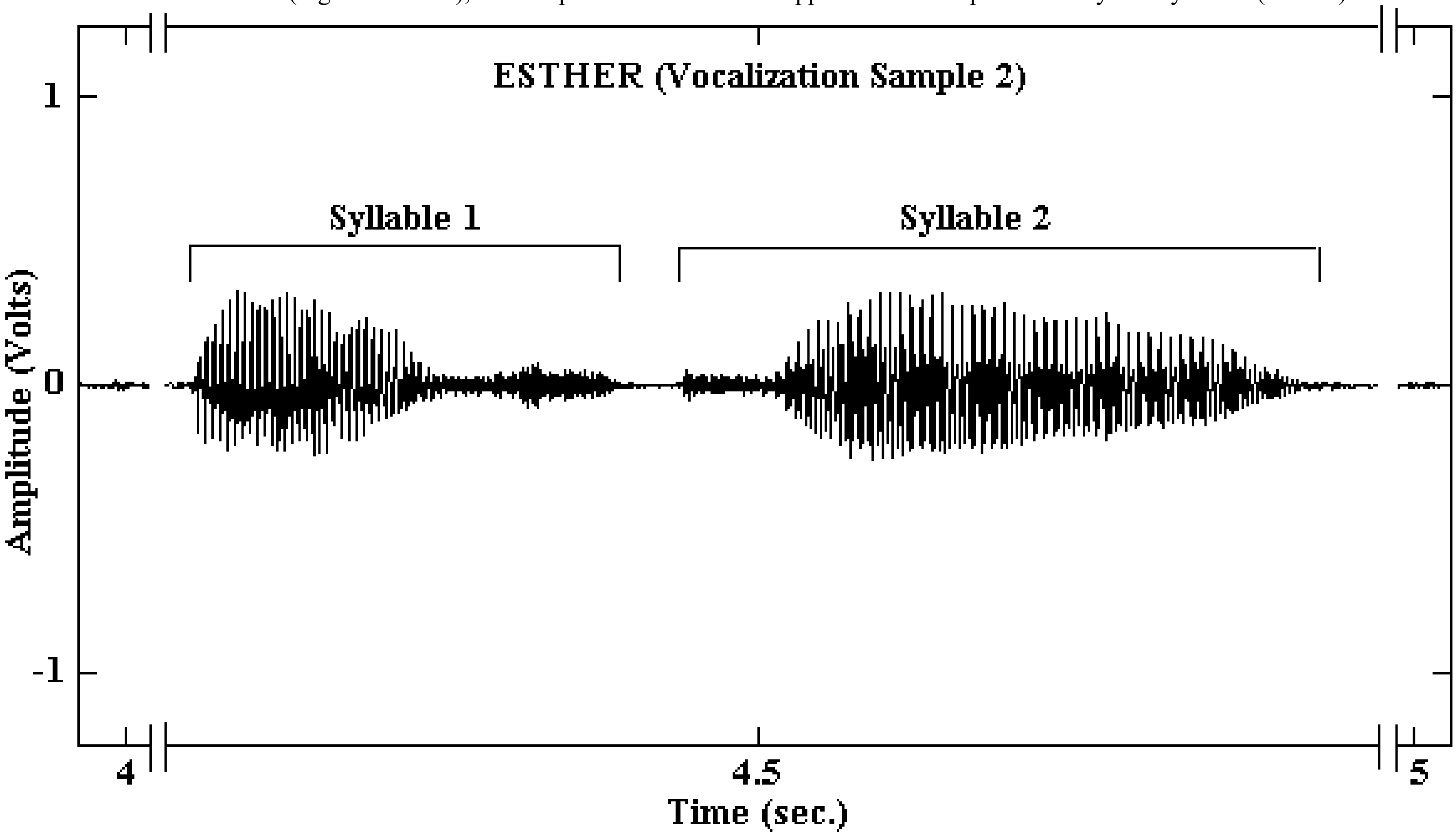

Table 3. Energy analysis for computer generated vocalizations of the name, Madonna.

Name (Sample No.)	Oscillogram Section	Syllable 1	Syllable 2*	Total Σ (V^2 •s)
Madonna (1)	Ener_0-10_Beg	0.00092864	0.00036996	
	Ener_10-50_Beg	1.8364	6.5175	
	Ener_50-90_Beg	0.025916	0.031933	
	Ener_90-Peak_Beg	0.076917	0.05929	
	Ener_Peak-90_End	0.04871	0.060531	
	Ener_90-50_End	0.19212	0.040423	
	Ener_50-10_End	0.53603	1.5857	
	Ener_10-0_End	0.00069178	0.0027569	
	Sample 1 Σ	Σ = 2.72	Σ = 8.30	Σ = 11.02
Madonna (2)	Ener_0-10_Beg	0.00062554	0.00018099	
	Ener_10-50_Beg	0.061199	6.0153	
	Ener_50-90_Beg	0.16476	0.026359	
	Ener_90-Peak_Beg	0.083546	0.033569	
	Ener_Peak-90_End	0.23365	0.11495	
	Ener_90-50_End	0.46287	0.036054	
	Ener_50-10_End	3.4743	1.8914	
	Ener_10-0_End	0.0022327	0.0013886	
	Sample 2 Σ	Σ = 4.48	Σ = 8.12	Σ = 12.60
Madonna (3)	Ener_0-10_Beg	0.0035173	0.00015813	
	Ener_10-50_Beg	0.1207	6.1837	
	Ener_50-90_Beg	4.0241	0.53324	
	Ener_90-Peak_Beg	0.1037	0.088947	
	Ener_Peak-90_End	0.18388	0.085303	
	Ener_90-50_End	0.65813	1.6463	
	Ener_50-10_End	1.1372	0.91201	
	Ener_10-0_End	0.0022676	0.0013873	
	Sample 3 Σ	Σ = 6.23	Σ = 9.45	Σ = 15.68
Avg (± Std Dev)				13.10 (± 2.37)

*Note: The Sound Ruler program, when using default parameters, interprets the 3 syllable name, Ma-don-na, as two syllables, Ma-donna.

Table 4. Energy analysis for computer generated vocalizations of the name, Esther.

Name (Sample No.)	Oscillogram Section	Syllable 1	Syllable 2	Total Σ (V^2 •s)
Esther (1)	Ener_0-10_Beg	0.00015941	0.00055525	
	Ener_10-50_Beg	0.1627	1.2559	
	Ener_50-90_Beg	0.47036	0.023382	
	Ener_90-Peak_Beg	0.16837	0.033471	
	Ener_Peak-90_End	0.14954	0.038258	
	Ener_90-50_End	0.43105	0.021438	
	Ener_50-10_End	0.31102	1.9808	
	Ener_10-0_End	0.0011383	0.00083935	
	Sample 1 Σ	Σ = 1.69	Σ = 3.35	Σ = 5.05
Esther (2)	Ener_0-10_Beg	0.00016636	0.00041699	
	Ener_10-50_Beg	0.035969	1.3528	
	Ener_50-90_Beg	0.14404	0.020805	
	Ener_90-Peak_Beg	0.039467	0.045205	
	Ener_Peak-90_End	0.038504	0.035883	
	Ener_90-50_End	0.82774	0.018974	
	Ener_50-10_End	0.3709	1.7569	
	Ener_10-0_End	0.00047307	0.001045	
	Sample 2 Σ	Σ = 1.46	Σ = 3.23	Σ = 4.69
Esther (3)	Ener_0-10_Beg	0.00056155	0.00078368	
	Ener_10-50_Beg	0.64714	0.9664	
	Ener_50-90_Beg	0.0081248	0.16294	
	Ener_90-Peak_Beg	0.037932	0.039837	
	Ener_Peak-90_End	0.038213	0.038405	
	Ener_90-50_End	0.0058804	0.030526	
	Ener_50-10_End	0.61898	2.5107	
	Ener_10-0_End	0.0010795	0.00089886	
	Sample 3 Σ	Σ = 1.36	Σ = 3.75	Σ = 5.11
Avg (± Std Dev)				4.95 (± 0.23)

Table 5. Comparison of the range of energies of the names Madonna and Esther, as vocalized by the author and by a computerized text-to-speech program. There is no significant difference between the energies of the name as spoken by the author, but with the computerized text-to-speech program the name, Madonna, has 2.6-fold higher energy.

Ranges of Energies (V^2 •s):
Madonna (author): 3.68<--------------4.88-------------->6.08
Esther (author): 3.75<4.16>4.57
Madonna (computer): 10.73<--13.10-->15.47
Esther (computer): 4.72<-4.95->5.18