Wade Research Foundation Reports (2007) 4 (6)

Acoustic Energy as the Basis for Given Name Preferences

David Wade, Wade Research Foundation, P.O. Box 257, Princeton, New Jersey 08542

Abstract

What is the basis of the preference for one given, or first, name versus another? This article explores that question by analyzing the acoustic, or sound, energy of vocalized names from the US Social Security Administration's list of the thousand most popular given names for the period of 2000-2005. The 100 most popular, and 100 least popular, male and female given names were vocalized by a computerized text-to-speech program, the vocalizations were recorded and analyzed by the Sound Ruler acoustic analysis program, and the results for the most and least popular groups were compared. Although it was possible to find substantial differences between the acoustic energies of individual names, when the names were considered as groups of 100, there were no significant differences between the average energies of the most popular and least popular name groups, or between male and female names. Consequently, the acoustic energies of vocalized names do not seem to be the basis of given name preferences.

Introduction

Great emphasis is placed on names in almost all cultures. For example, in the tradition of Orthodox Judaism, the name of the Creator is too sacred to be spoken or written [1]. The importance of names has also been alluded to in the plays of William Shakespeare [2]. In Romeo and Juliet (Act II, Scene II), the topic of family names seems to be of particular concern to Juliet, who poses the famous question, "What's in a name?". In Othello, the Moor of Venice (Act II. Scene III), Othello tells Montano, "The world hath noted, and your name is great…". Three millennia after the Sacred Name was revealed to Moses, and nearly 400 years after the death of Shakespeare, the importance of names in culture continues unabated. In 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" [3].

What are the properties of names that endow them with various qualities? In names composed of letters of the English alphabet, there can be inherent differences, such as in the number of letters comprising the name (i.e., the lengths of names), and also in the number of vowels and consonants in the name. Differences in written names are detected through the physiological mechanisms of vision. Spoken names are the product of the physiological mechanisms of speech which produce compressions of air that can be detected by the physiological mechanisms of hearing. In the cases of both vision and hearing, it is the recipient human brain that assigns qualitative differences to the names seen and heard. Therefore, the most accurate test of qualitative differences in written or spoken names would probably be direct visualization of brain activity in response to the perception of written or spoken names. Noninvasive techniques can be used for such studies, such as EEG (electroencephalography) and fMRI (functional magnetic resonance imaging) [4], but these techniques require elaborate equipment, and experiments utilizing these techniques would be expensive to conduct. An alternative, low tech, and relatively inexpensive method to determine qualitative differences between names was used in this study, and it involved the measurement and comparison of the acoustic energies of names.

Methods

The names used for these experiments were taken from the U.S. Social Security Administration's (SSA's) list of the 1,000 most popular baby names for the period of 2000-2005 (Tables 1-4) [5]. The data contain the name, the number of males or females having that name, and the percent of total male (12,485,039) or female (11,929,533) names that the name of interest represents. It should be noted that the SSA does not publish a list of the least popular names, due to privacy concerns. Consequently, a comparison of the most and absolute least popular names is not possible, and these experiments were instead concerned with comparisons between the most and least popular of the 1,000 most popular names.

The analytical approach utilized in this study was the measurement and comparison of the acoustic, or sound, energies of vocalized names. The procedures involved have been described in detail in a previous publication [6].

Results

Typical oscillogram results for three successive vocalizations are shown in Figures 1 (Jacob, most popular male name), 2 (Terrence, least popular male name), 3 (Emily, most popular female name), and 4 (Jacklyn, least popular female name). Each of these figures contains four separate graphs. The first graph of each figure shows three successive vocalizations of each name, and the remaining three graphs of each figure show expanded views of each of the three separate vocalizations. Close examination of the first graph in each figure, the oscillogram containing three successive vocalizations, reveals that while the vocalizations are very similar, they are not identical (see also Figures 2 and 5 of reference 6). The reason for this is unknown, but it was the basis for using average energies obtained from three successive vocalizations. Table 5 illustrates the type of energy data obtained from the analysis of oscillograms, and the calculation of average energies, for the most popular male name, Jacob.

Tables 6-9 show the average energy results obtained for each of the 400 names analyzed, and Figures 5-6 show histograms of the average energy values from Tables 6-9. The average energy values for male names (Figure 5) occur in the range of 3 V^2•sec (Guy, rank 916, Table 7) to 59 V^2•sec (Gabriel, rank 34, Table 6). The values for male names are not normally distributed, but rather are skewed toward lower values in the range, and seem centered around median values of 16-19 V^2•sec. There is an obvious overlap in the ranges of average energy values for the most popular and least popular male names. The average energy values for female names (Figure 6) occur in the range of 1 V^2•sec (Mina, rank 994, Table 9) to 51 V^2•sec (Angelina, rank 75, Table 8), almost the same range of average energy values obtained for male names. The average energy values for female names more closely approximate normal distributions than do the male names, but they are still slightly skewed toward lower values that seem to center around median values of 18-20 V^2•sec. As found with the average energy values for male names, there is also an obvious overlap in the ranges of average energy values for the most popular and least popular female names. In addition, there is an overlap of the average energy values for all male and female names. Statistical parameters obtained from these results are summarized in Table 10.

In summary, substantial differences occur between the average energies of names when comparisons are made between individual names. However, when compared as groups of 100 names (i.e., most versus least popular names), there are substantial overlaps in the ranges and central values for the average energies of name groups, and this result is independent of the sex category of the name (i.e., male vs. male, female vs. female, or male vs. female).

Conclusions and Discussion

The acoustic energy of vocalized names may be a basis for preferences among individual names (e.g., preferences for one name vs. another) [6], but when names are considered as large groups (i.e., 100 most popular vs. 100 least popular), the ranges and central values of acoustic energies are not significantly different, and, therefore, probably not the basis for the differences in the popularities of names.

However, acoustic energy is not the only physical quality of a sound. The Sound Ruler program provides much more analytical data about a sound than its energy, such as the frequency of the sound versus time and the amplitude of the sound versus its frequency. Examples of such data are shown in Figures 7-8 for the most and least popular male names, Jacob and Terence, and in Figures 9-10 for the most and least popular female names, Emily and Jacklyn. Differences between these additional qualities are obvious. The possibility that they might form the basis for differences in name preferences remains a subject for future investigation.

Acknowledgements

The impetus for this work originated from a quotation made to the author by Prof. Leonard R.N. Ashley at the 45th Annual International Names Institute, May 2006, held at Baruch College, City University of New York. In Act I of the Oscar Wilde play, The Importance of Being Earnest, the character, Gwendolen, states "...It is a divine name. It has a music of its own. It produces vibrations." The association between names and vibrations was useful in helping the author select an experimental method that would enable the direct measurement of energies of names. The author thanks Dr. Marcos Gridi-Papp, of the University of California at Los Angeles and inventor of the Sound Ruler program, for assistance in interpreting results obtained with the program.

References

1. HaShem, Judaism 101 glossary, Orthodox Union website, 2007. (http://www.ou.org/glossary/article/hashem/)
2. Craig, W.J., ed., "Romeo and Juliet." and "Othello, the Moor of Venice" in The Complete Works of William Shakespeare, Oxford University Press, London, 1914; Bartleby.com, 2000. (http://www.bartleby.com/70/).
3. News Archives for June 16, 2004 ["Madonna Interview on 20/20 (ABC)"] on the official Madonna website (http://www.madonna.com/).
4. Debener, S., Ullsperger, M., Siegel, M., Engel, A.K. Single-trial EEG-fMRI reveals the dynamics of cognitive function. Trends in Cognitive Sciences (2006) 10: 558-563.
5. Popular baby names by decade, U.S. Social Security Administration's list of the 1,000 most popular baby names for 2000-2006. Note: this list was updated on March 6, 2007, after the experiment with 2000-2005 names had begun, to include names for 2006. (http://www.socialsecurity.gov/OACT/babynames/decades/names2000s.html)
6. Wade, D. Determining the energies of names (revised version). Wade Research Foundation Reports (2007) 4 (3): 1-14. (http://wade-research.com/images/Name_Energy_rev__03-27-07.pdf)
7. Copies of the sound files (.wav files) and energy data (.doc files) generated in these experiments are available upon request to the author.

8. A preliminary version of this work, the results of analyses of the 57 most popular and 57 least popular male and female names was presented by the author at the 46th Annual International Names Institute, held at Baruch College on May 5, 2007
9. Note: A previous version of this article was published online on August 24, 2007. It was a scanned version of a printed MS Word document, and had a file size of 9.5 Mb. In order to reduce the file size, the MS Word file was processed with PDF file making software which introduced some errors into the horizontal axes labels of several figures. Consequently, the axes labels of all figures were recreated in the MS Word file version. In addition, an error in the units of acoustic energy, (V^2•cm), was discovered in the titles of Figures 5 and 6, and in the text of the Results section of the article (page 2), and it was corrected [i.e., (V^2•cm) was changed to (V^2•sec)]. The MS Word file was then reprocessed with the PDF file making software, resulting in the current version of the article.

Wade Research Foundation Reports (2007) 4 (6)

Figure 1. Oscillogram (top) of the most popular male name, Jacob, as spoken three times in succession by a text-to-speech program, recorded simultaneously and converted to a sound file, and then analyzed by the Sound Ruler acoustic analysis program. The vertical axis is the amplitude in volts, and the horizontal axis is time in seconds. Detailed views of each of the three vocalizations, with voltage peaks at 3.4, 4.6, and 5.7 seconds, are shown below and on the next page [Jacob (1) – Jacob (3)]. Each vocalization is clearly divided into two syllables (i.e., Ja-cob).

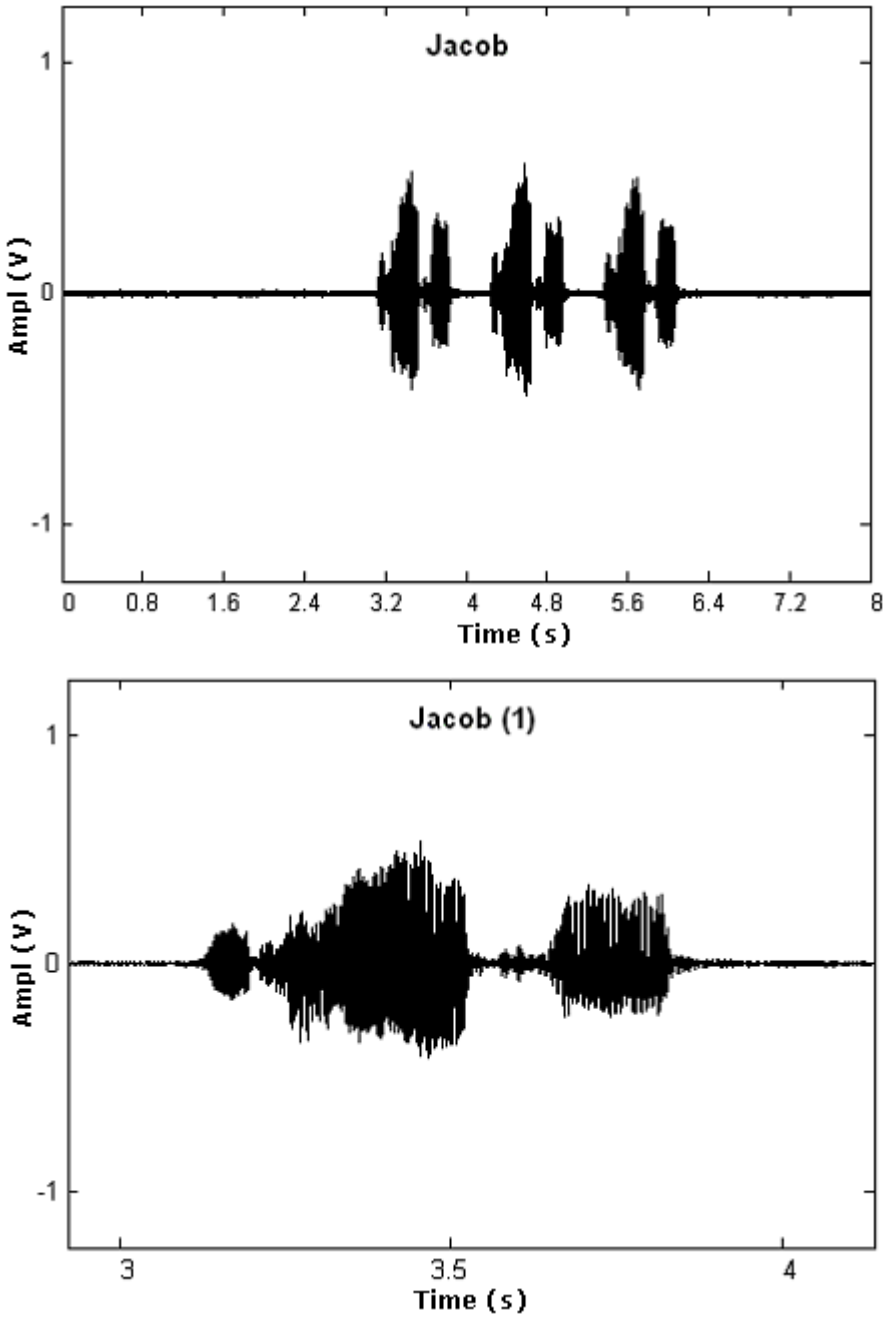
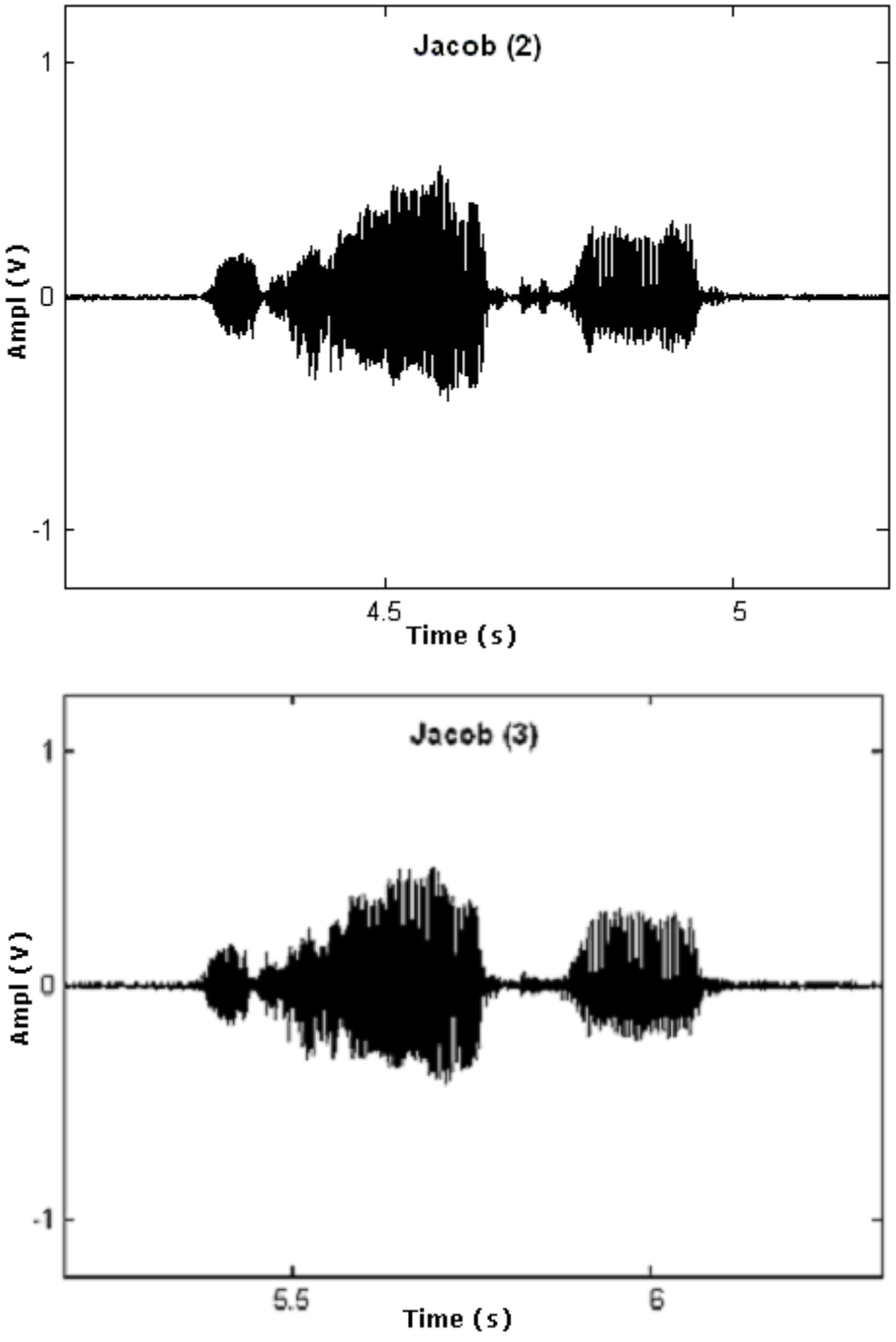
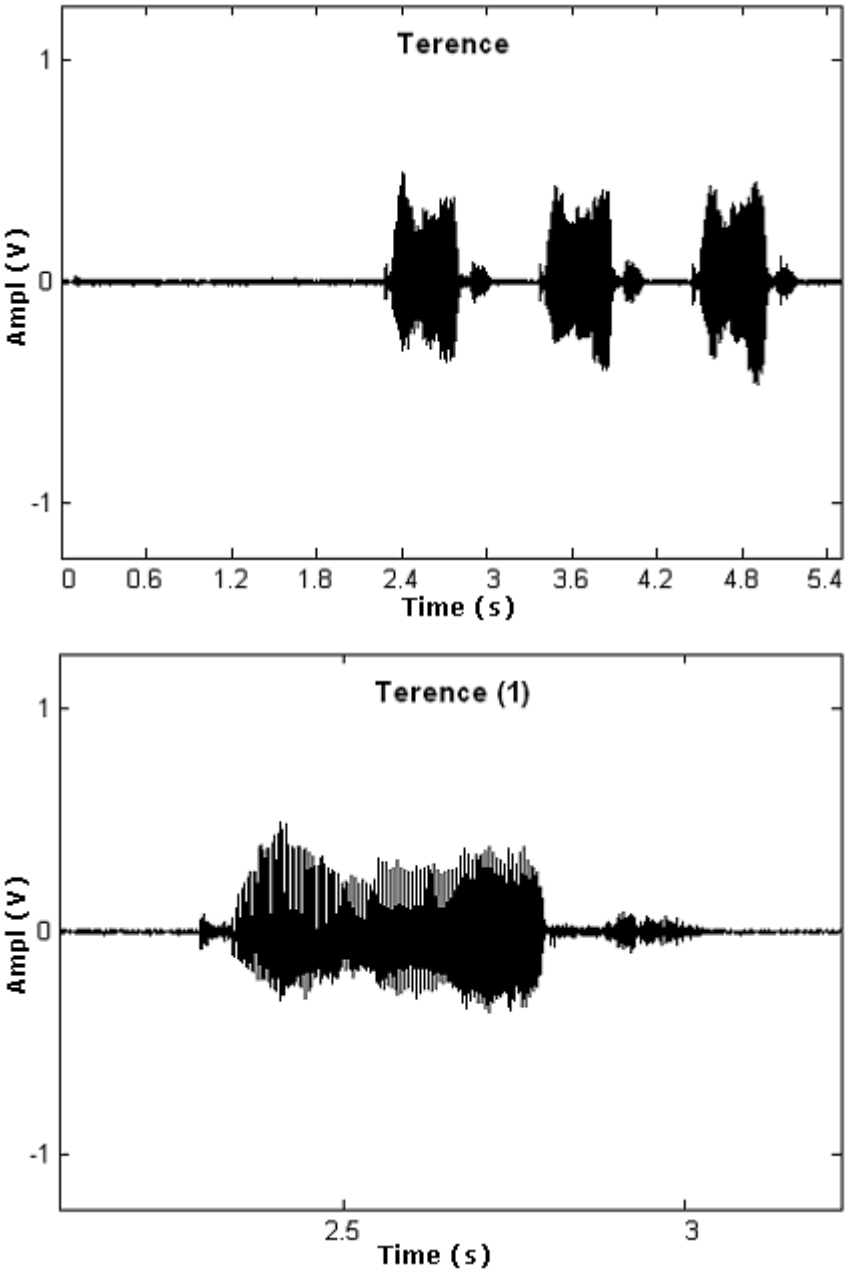


Figure 1 (Continued from previous page.)



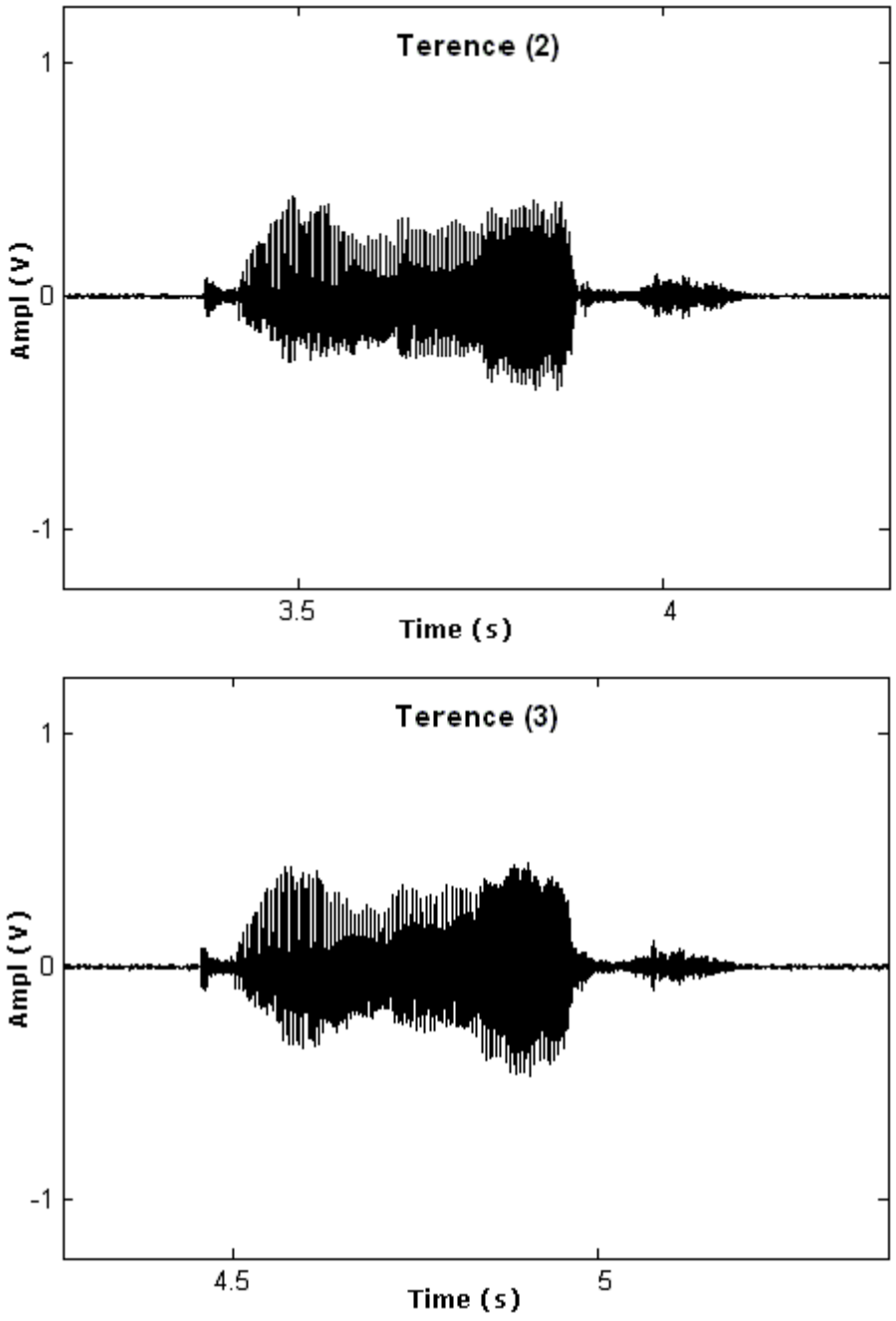
Wade Research Foundation Reports (2007) 4 (6)

Figure 2. Oscillogram (top) of the least popular male name, Terence, as spoken three times in succession by a text-to-speech program, recorded simultaneously and converted to a sound file, and then analyzed by the Sound Ruler acoustic analysis program. The vertical axis is the amplitude in volts, and the horizontal axis is time in seconds. Detailed views (bottom and next page) of each of the three vocalizations that occurred with voltage peaks at 2.4, 3.6, and 4.6 seconds. The two syllables (Te-rence) are not as distinct as those in Jacob (Figure 2).



Wade Research Foundation Reports (2007) 4 (6)

Figure 2. (Continued from previous page.)



Wade Research Foundation Reports (2007) 4 (6)

Figure 3. Oscillogram (top) of the most popular female name, Emily, as spoken three times in succession by a text-to-speech program, recorded simultaneously and converted to a sound file, and then analyzed by the Sound Ruler acoustic analysis program. The vertical axis is the amplitude in volts, and the horizontal axis is time in seconds. Detailed views (bottom and next page) of each of the three vocalizations that occurred with voltage peaks at 2.9, 3.7, and 4.5 seconds.

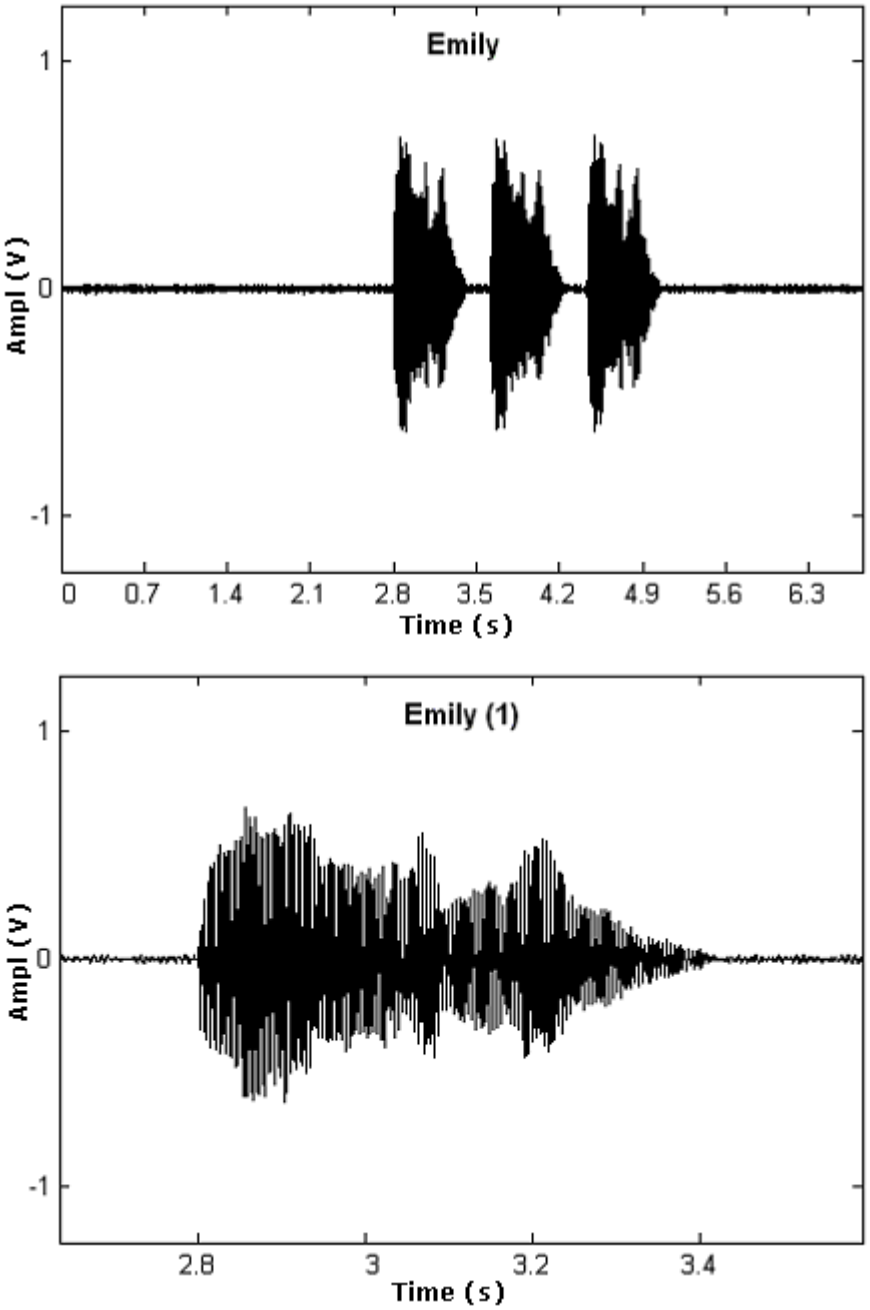
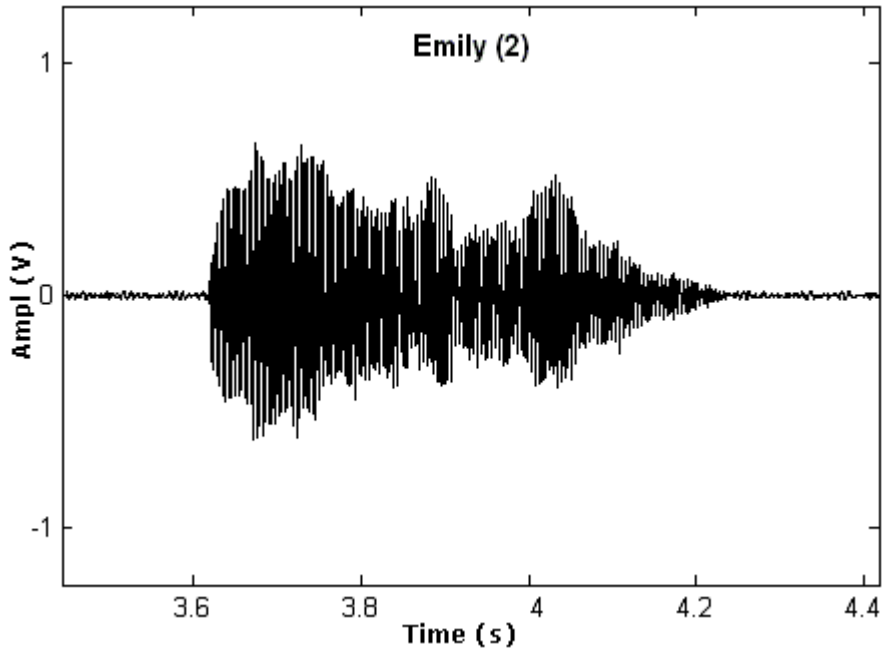


Figure 3 (Continued from previous page.)



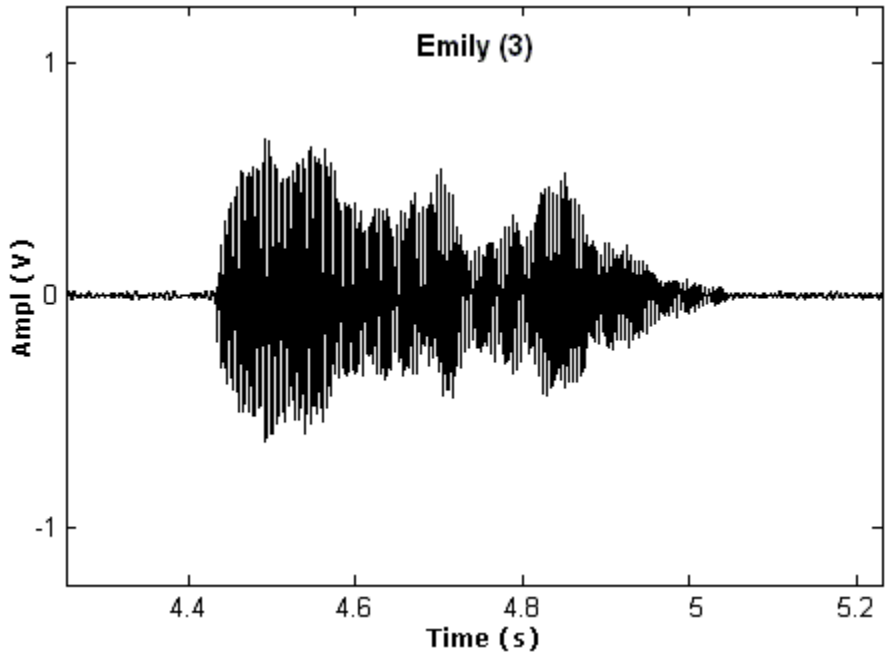


Figure 4. Oscillogram (top) of the least popular female name, Jacklyn, as spoken three times in succession by a text-to-speech program, recorded simultaneously and converted to a sound file, and then analyzed by the Sound Ruler acoustic analysis program. The vertical axis is the amplitude in volts, and the horizontal axis is time in seconds. The syllables in the most popular female name, Emily are not distinct (Figure 3), whereas the two syllables of Jacklyn are distinct. Detailed views (bottom and next page) of each of the three vocalizations with first syllable voltage peaks at 2.5, 3.5, and 4.6 seconds.

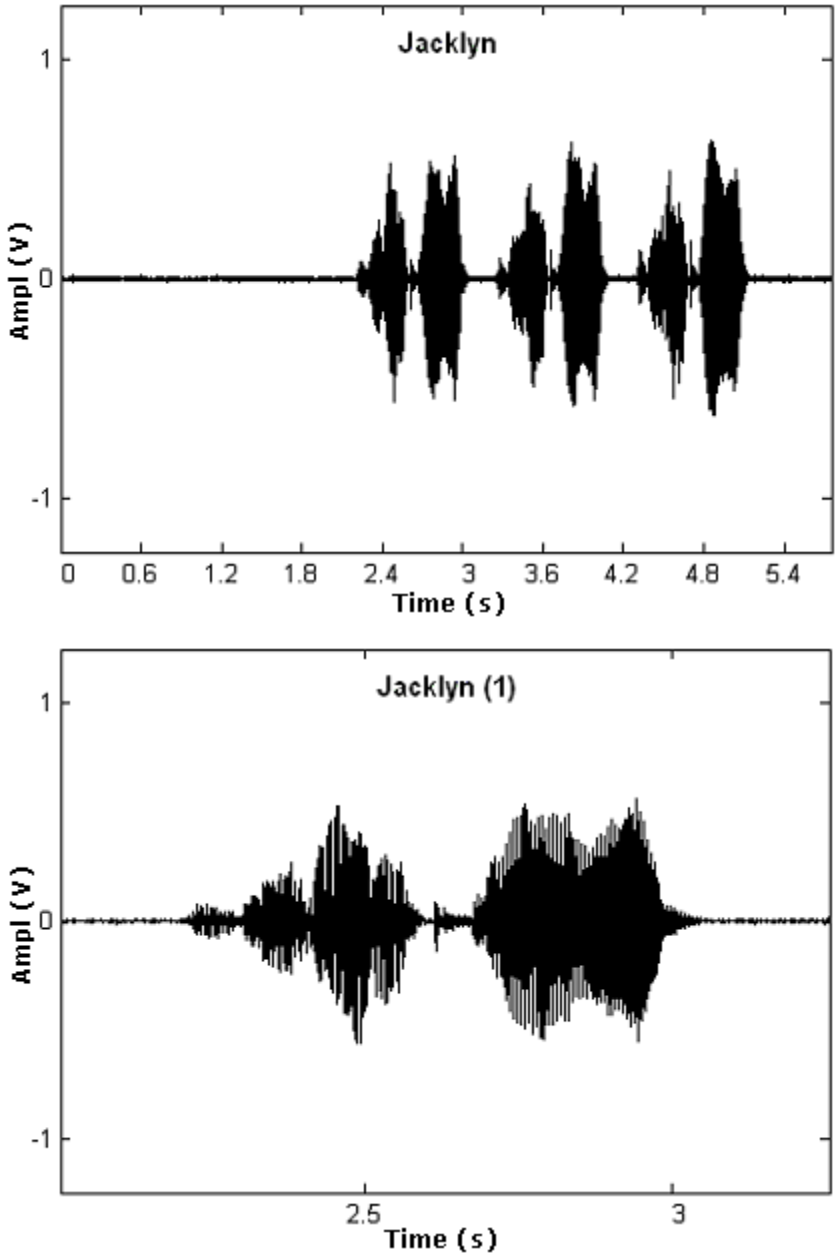
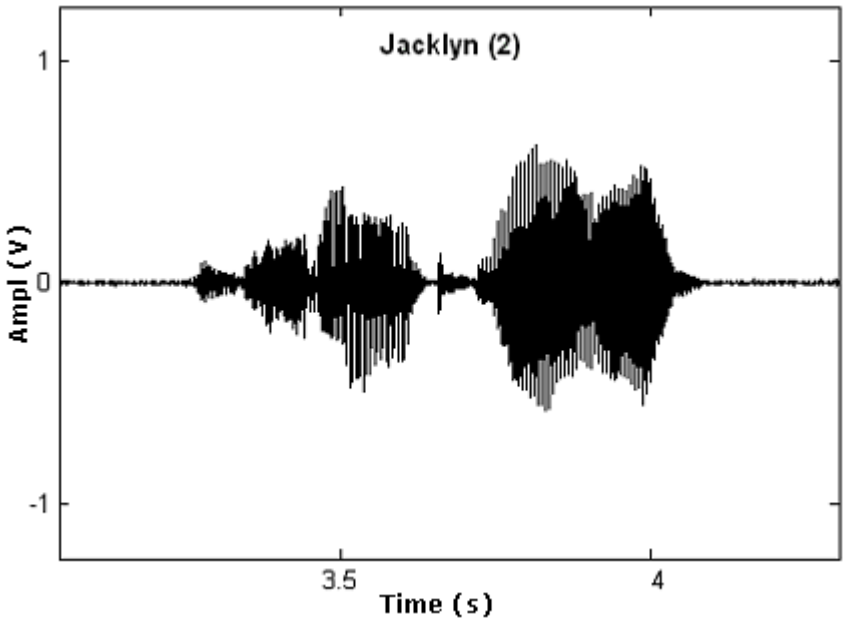
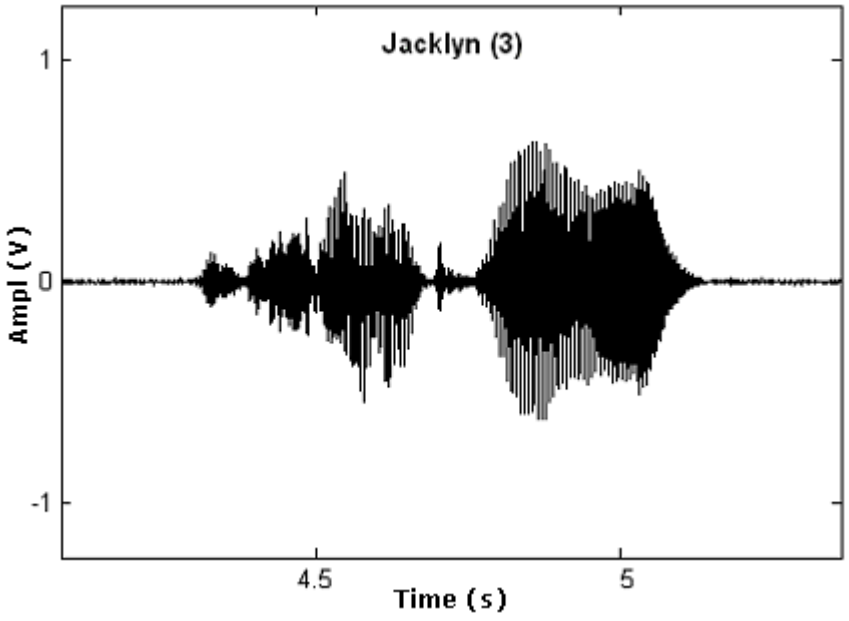


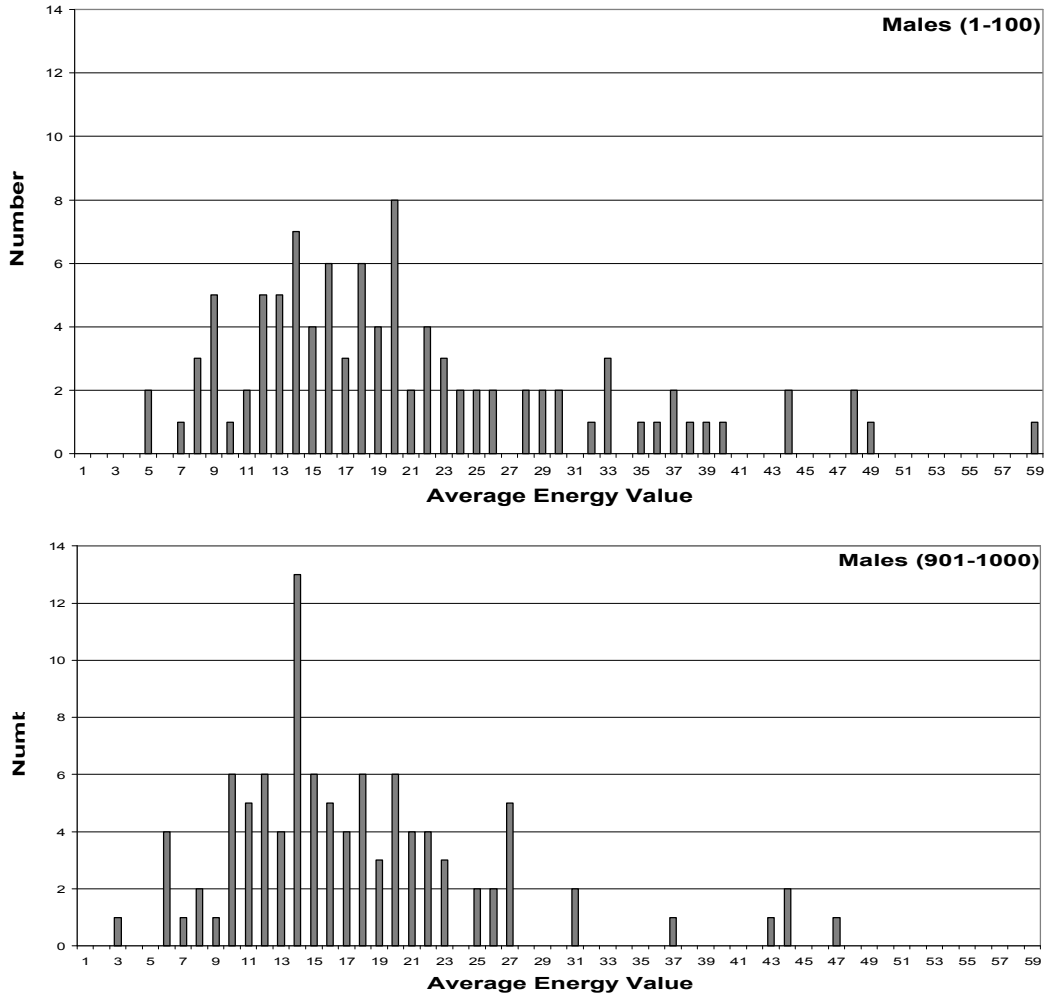
Figure 4. (Continued from previous page.)





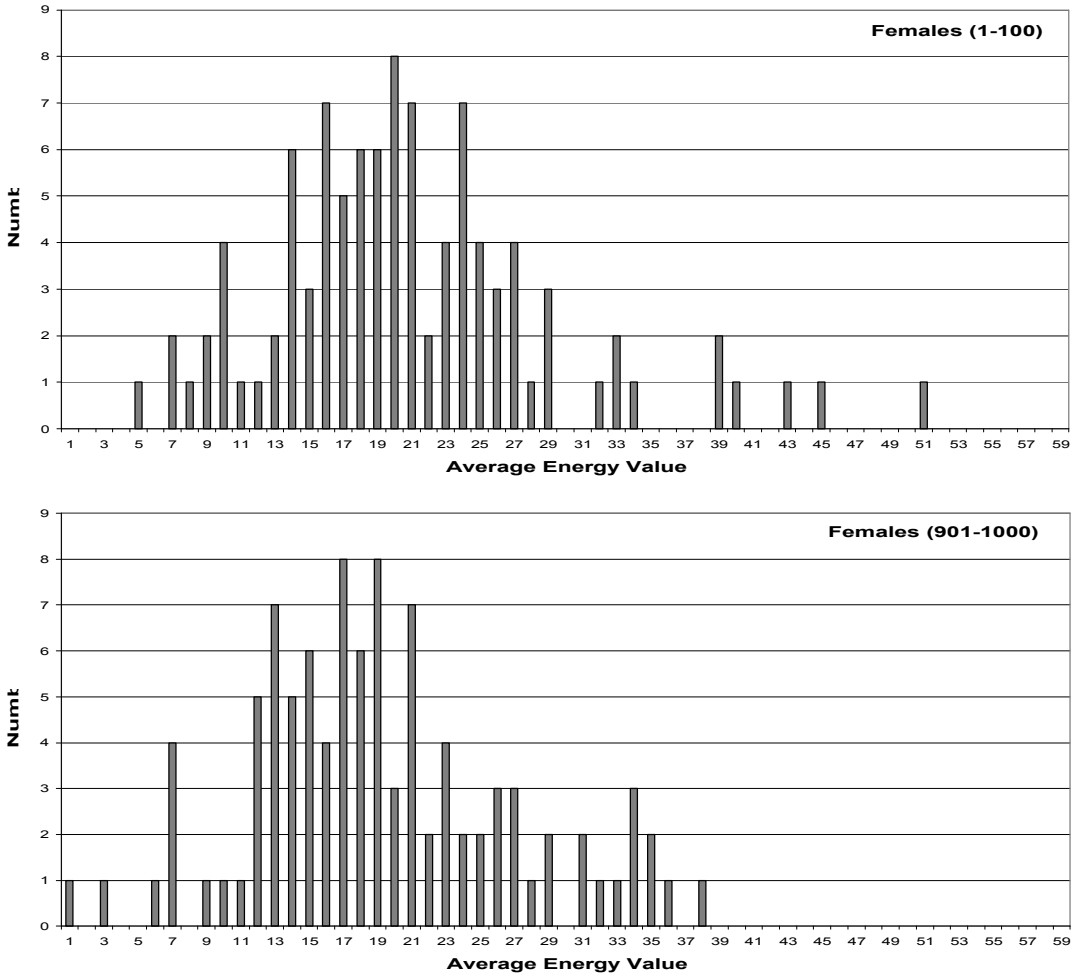
Wade Research Foundation Reports (2007) 4 (6)

Figure 5. Histograms of the frequency of occurrence of average energy values (V^2•sec) for the 100 most (top) and 100 least (bottom) popular male names.



Wade Research Foundation Reports (2007) 4 (6)

Figure 6. Histograms of the frequency of occurrence of average energy values (V^2•sec) for the 100 most (top) and 100 least (bottom) popular female names.



Wade Research Foundation Reports (2007) 4 (6)

Figure 7. Spectrogram of frequency versus time for the most popular male name, Jacob (top), and the least popular male name, Terence (bottom). There are clear differences between the two patterns.

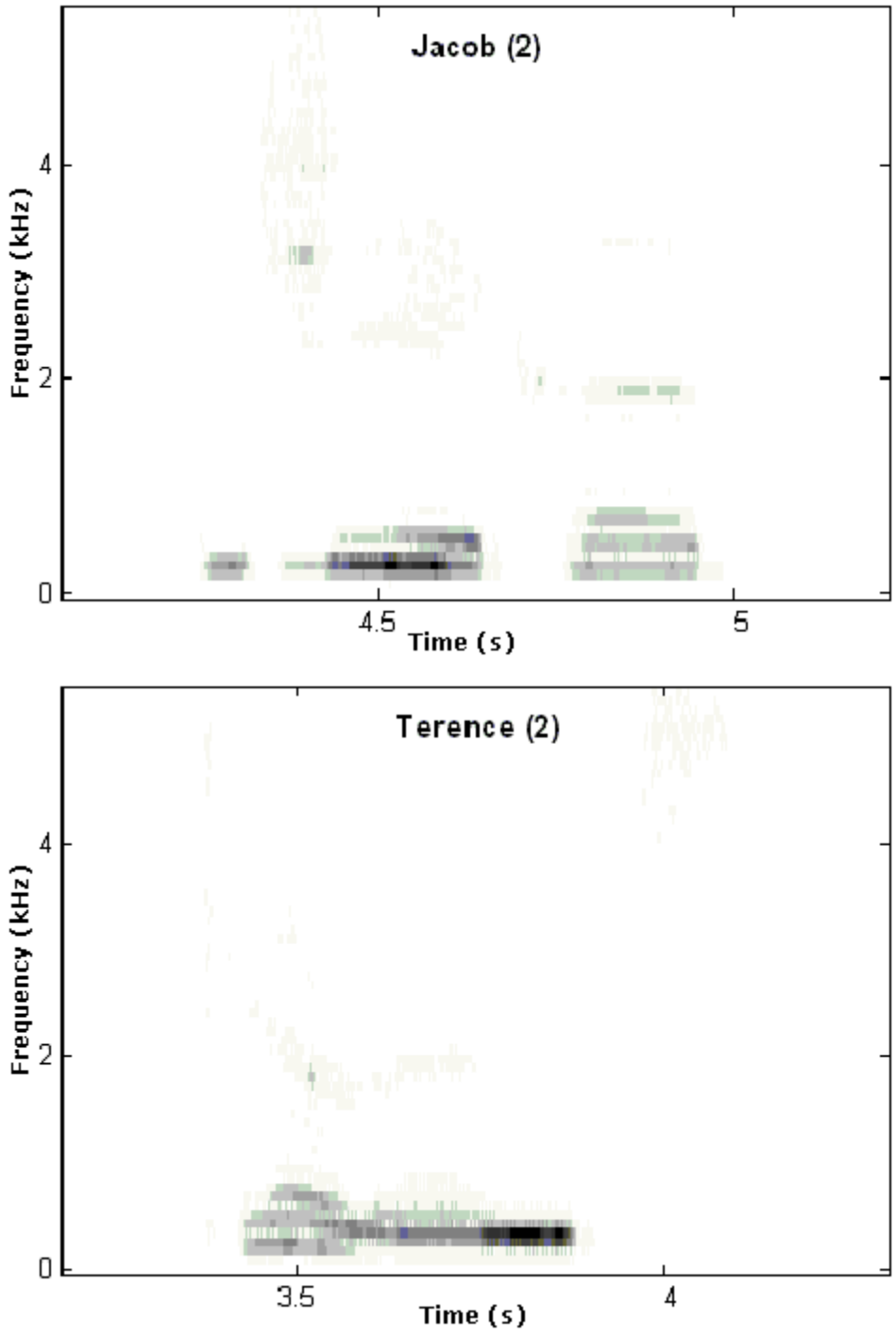


Figure 8. Power spectra of amplitude versus frequency for the most popular male name, Jacob (top), and the least popular male name, Terence (bottom). There are clear differences between the two graphs.

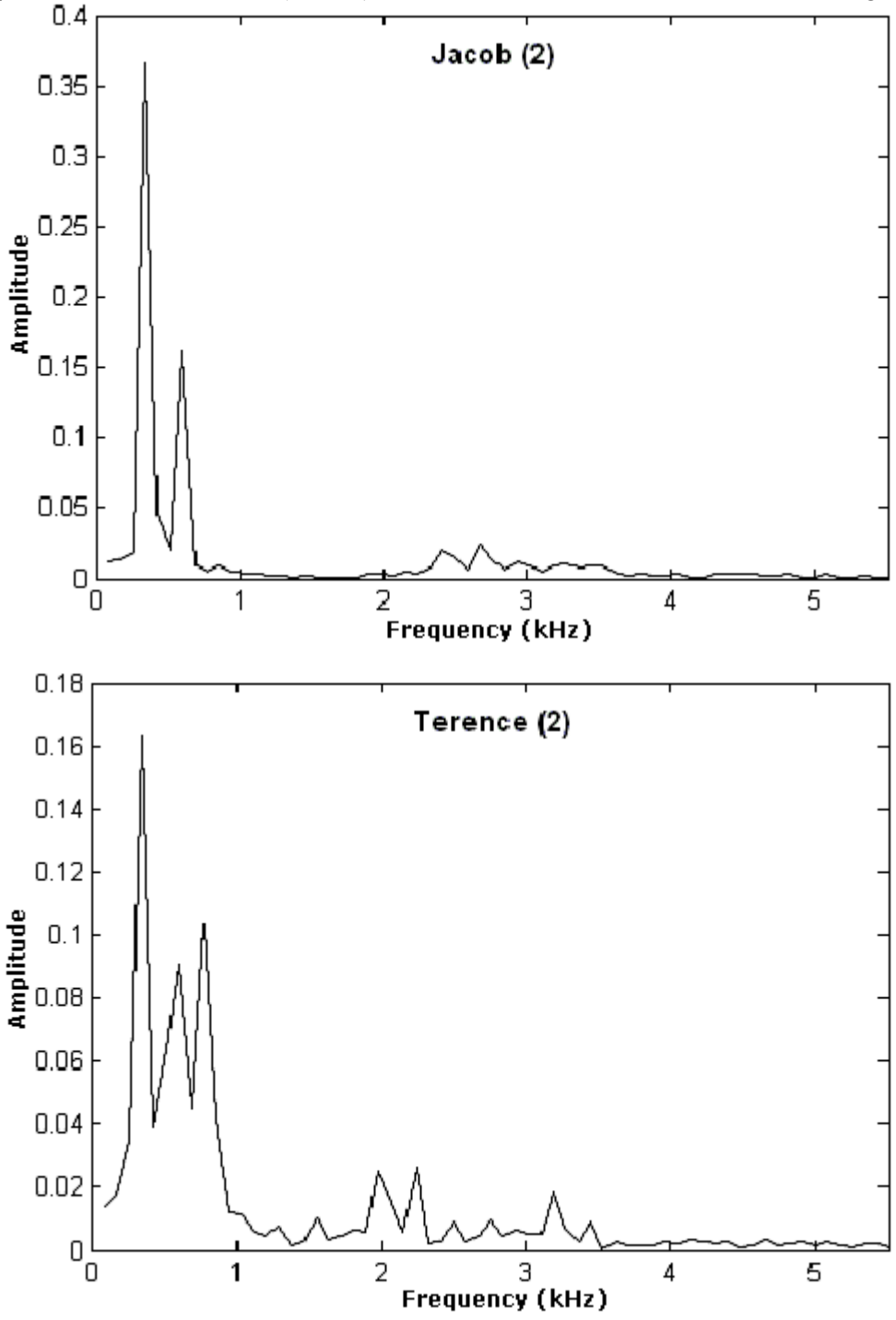


Figure 9. Spectrogram of frequency versus time for the most popular female name, Emily (top), and the least popular female name, Jacklyn (bottom). There are clear differences between the two patterns.

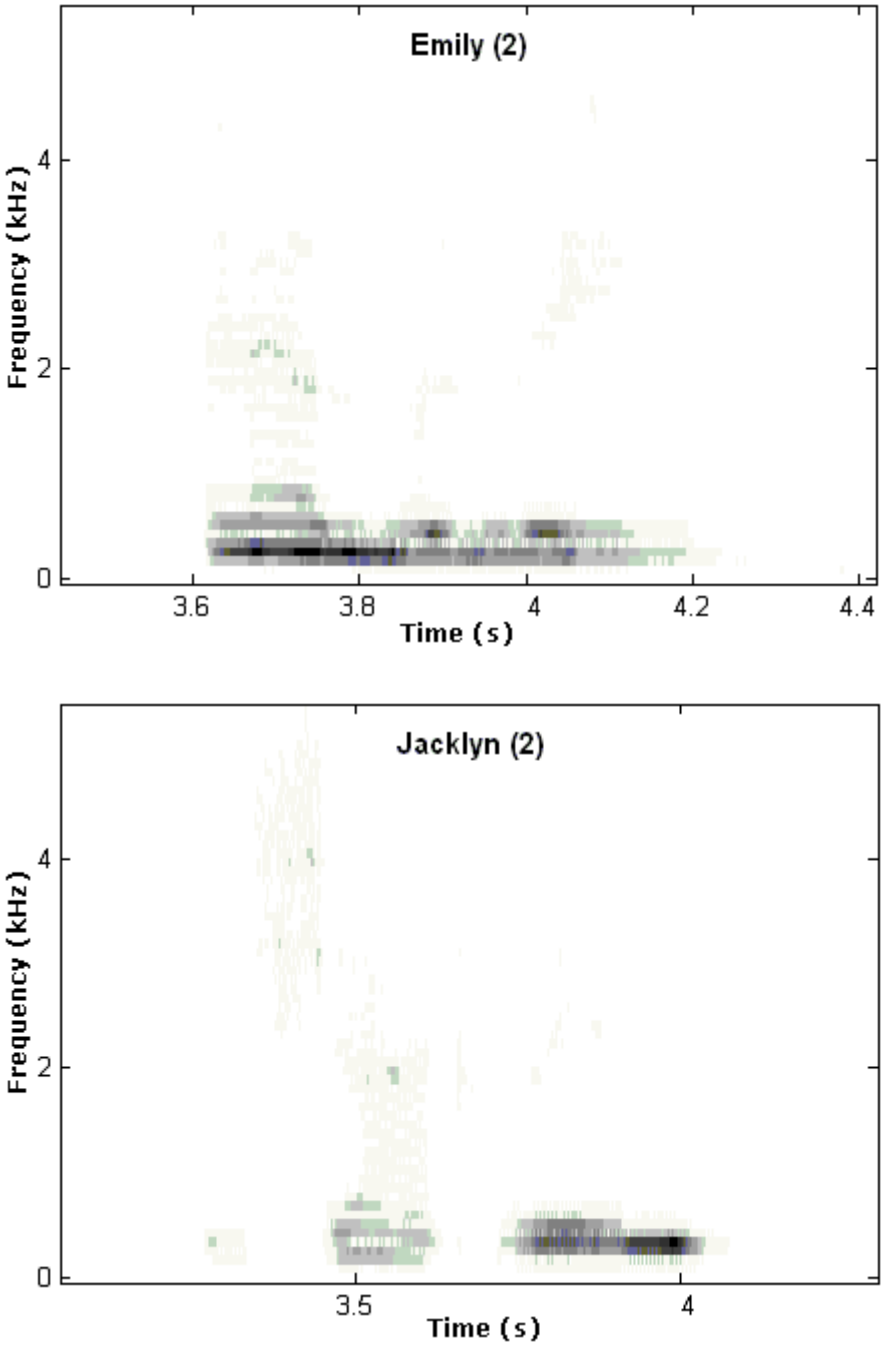
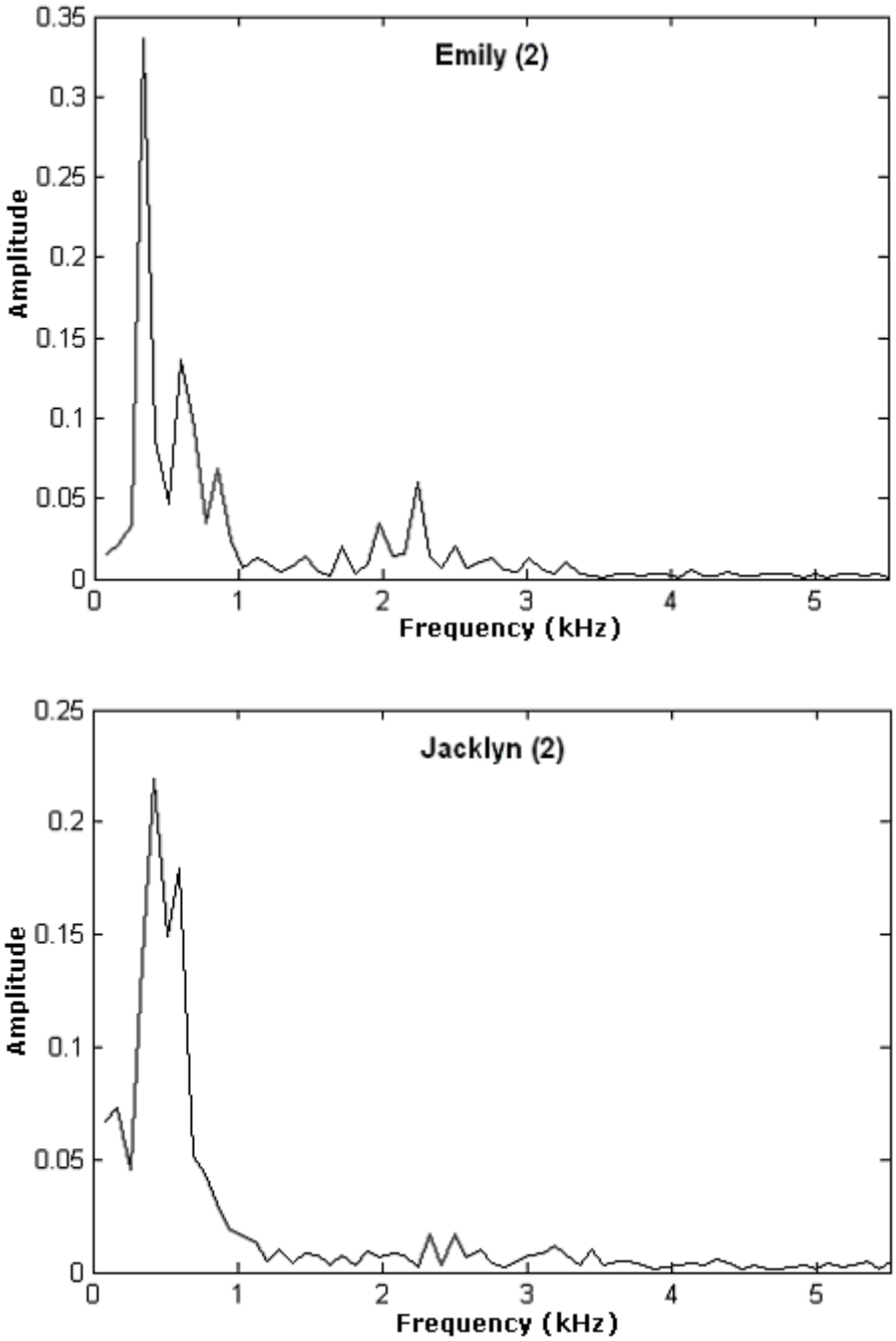


Figure 10. Power spectra of amplitude versus frequency for the most popular female name, Emily (top), and the least popular female name, Jacklyn (bottom). There are clear differences between the two graphs.



Wade Research Foundation Reports (2007) 4 (6)

Table 1. SSA data for the 100 most popular male names for the period of 2000-2005 (name, number, percent of total, and rank).

Rank	Name	No.	Percent	Rank	Name	No.	Percent	Rank	Name	No.	Percent	Rank	Name	No.	Percent
1	Jacob	179,896	1.4409	26	Benjamin	83,598	0.6696	51	Mason	47,929	0.3839	76	Richard	31,830	0.2549
2	Michael	165,257	1.3236	27	Nathan	81,086	0.6495	52	Jackson	47,922	0.3838	77	Julian	31,775	0.2545
3	Joshua	151,094	1.2102	28	Austin	77,654	0.622	53	Eric	47,049	0.3768	78	Chase	30,749	0.2463
4	Matthew	148,038	1.1857	29	Noah	76,969	0.6165	54	Brian	47,043	0.3768	79	Patrick	30,347	0.2431
5	Andrew	131,862	1.0562	30	Logan	74,896	0.5999	55	Juan	46,933	0.3759	80	Blake	30,118	0.2412
6	Christopher	129,095	1.034	31	Jose	73,835	0.5914	56	Adam	45,370	0.3634	81	Owen	29,361	0.2352
7	Joseph	126,394	1.0124	32	Kevin	70,856	0.5675	57	Charles	44,975	0.3602	82	Sebastian	29,111	0.2332
8	Daniel	125,929	1.0086	33	Robert	70,174	0.5621	58	Luis	44,827	0.359	83	Jayden	29,010	0.2324
9	Nicholas	123,580	0.9898	34	Gabriel	68,003	0.5447	59	Aidan	44,311	0.3549	84	Jared	28,515	0.2284
10	Ethan	119,697	0.9587	35	Thomas	67,216	0.5384	60	Gavin	43,391	0.3475	85	Antonio	28,426	0.2277
11	William	119,430	0.9566	36	Caleb	66,143	0.5298	61	Sean	41,206	0.33	86	Jeremiah	28,331	0.2269
12	Anthony	117,368	0.9401	37	Jordan	62,953	0.5042	62	Alex	40,041	0.3207	87	Trevor	28,065	0.2248
13	Ryan	112,818	0.9036	38	Hunter	62,033	0.4969	63	Nathaniel	39,997	0.3204	88	Miguel	27,498	0.2202
14	David	111,952	0.8967	39	Cameron	61,843	0.4953	64	Carlos	38,570	0.3089	89	Diego	27,248	0.2182
15	Tyler	111,136	0.8902	40	Elijah	59,348	0.4754	65	Bryan	38,521	0.3085	90	Xavier	27,073	0.2168
16	John	105,165	0.8423	41	Jason	57,064	0.4571	66	Ian	37,773	0.3025	91	Aiden	27,033	0.2165
17	Alexander	104,903	0.8402	42	Kyle	55,554	0.445	67	Jesus	37,278	0.2986	92	Jesse	27,009	0.2163
18	James	100,743	0.8069	43	Jack	54,849	0.4393	68	Steven	36,213	0.2901	93	Dominic	26,652	0.2135
19	Brandon	96,345	0.7717	44	Connor	52,837	0.4232	69	Adrian	35,216	0.2821	94	Alejandro	26,557	0.2127
20	Zachary	95,749	0.7669	45	Aaron	52,811	0.423	70	Timothy	35,182	0.2818	95	Hayden	26,358	0.2111
21	Jonathan	91,717	0.7346	46	Isaiah	52,736	0.4224	71	Lucas	34,967	0.2801	96	Garrett	26,093	0.209
22	Dylan	90,660	0.7261	47	Luke	52,486	0.4204	72	Cole	34,708	0.278	97	Jaden	25,540	0.2046
23	Christian	87,497	0.7008	48	Evan	51,287	0.4108	73	Cody	34,503	0.2764	98	Mark	25,349	0.203
24	Samuel	85,914	0.6881	49	Angel	50,793	0.4068	74	Seth	33,635	0.2694	99	Jake	24,632	0.1973
25	Justin	84,561	0.6773	50	Isaac	50,766	0.4066	75	Devin	32,995	0.2643	100	Victor	24,631	0.1973

Note: No., number.

Wade Research Foundation Reports (2007) 4 (6)

Table 2. SSA data for the 100 least popular male names for the period of 2000-2005 (name, number, percent of total, and rank).

Rank	Name	No.	Percent	Rank	Name	No.	Percent	Rank	Name	No.	Percent	Rank	Name	No.	Percent
901	Heriberto	962	0.0077	926	Darrin	871	0.007	951	Kent	752	0.006	976	Valentin	673	0.0054
902	Ean	961	0.0077	927	Zavier	867	0.0069	952	Glen	751	0.006	977	Mariano	669	0.0054
903	Layton	959	0.0077	928	Stuart	867	0.0069	953	Ethen	747	0.006	978	Pierre	666	0.0053
904	Stephon	959	0.0077	929	Marques	865	0.0069	954	Justyn	733	0.0059	979	Rocky	663	0.0053
905	Jagger	958	0.0077	930	Trevion	862	0.0069	955	Syed	733	0.0059	980	Kyan	663	0.0053
906	Zain	955	0.0076	931	Samson	859	0.0069	956	Konner	732	0.0059	981	Cannon	657	0.0053
907	Cristobal	951	0.0076	932	Khalid	848	0.0068	957	Turner	727	0.0058	982	Mathias	654	0.0052
908	Yosef	949	0.0076	933	Santino	847	0.0068	958	Jamil	713	0.0057	983	Freddie	651	0.0052
909	Simeon	947	0.0076	934	Forrest	846	0.0068	959	Zack	711	0.0057	984	Kyree	651	0.0052
910	Raymundo	934	0.0075	935	Adriel	845	0.0068	960	Bronson	707	0.0057	985	Ryland	632	0.0051
911	Dwight	933	0.0075	936	Giovani	840	0.0067	961	Sabastian	707	0.0057	986	Konnor	632	0.0051
912	Jovanni	926	0.0074	937	Gannon	839	0.0067	962	Vernon	704	0.0056	987	Austyn	618	0.0049
913	Jamir	926	0.0074	938	Kurtis	839	0.0067	963	Kanye	704	0.0056	988	Kaeden	617	0.0049
914	Cohen	924	0.0074	939	Latrell	834	0.0067	964	Sullivan	693	0.0056	989	Rex	596	0.0048
915	Gino	921	0.0074	940	Ulysses	818	0.0066	965	Immanuel	693	0.0056	990	Jahiem	580	0.0046
916	Guy	916	0.0073	941	Cason	797	0.0064	966	Cash	692	0.0055	991	Matthias	578	0.0046
917	Damarion	914	0.0073	942	Cael	787	0.0063	967	Eliseo	692	0.0055	992	Soren	577	0.0046
918	Trever	912	0.0073	943	Jakobe	787	0.0063	968	Jordyn	691	0.0055	993	Joan	576	0.0046
919	Andreas	905	0.0072	944	Carlton	783	0.0063	969	Darrion	691	0.0055	994	Mitchel	568	0.0045
920	Malakai	884	0.0071	945	Yair	769	0.0062	970	Ryker	685	0.0055	995	Devante	564	0.0045
921	Benny	884	0.0071	946	Kory	768	0.0062	971	Enzo	682	0.0055	996	Garett	560	0.0045
922	Rahul	882	0.0071	947	Clifton	764	0.0061	972	Jevon	680	0.0054	997	Maximo	555	0.0044
923	Bradyn	880	0.007	948	Shemar	763	0.0061	973	Kamari	679	0.0054	998	Kelly	555	0.0044
924	Bret	879	0.007	949	Colt	760	0.0061	974	Yusuf	677	0.0054	999	Lonnie	548	0.0044
925	Aydan	874	0.007	950	Jovanny	760	0.0061	975	Niko	674	0.0054	1000	Terence	543	0.0043

Note: No., number.

Wade Research Foundation Reports (2007) 4 (6)

Table 3. SSA data for the 100 most popular female names for the period of 2000-2005 (name, number, percent of total, and rank).

Rank	Name	No.	Percent	Rank	Name	No.	Percent	Rank	Name	No.	Percent	Rank	Name	No.	Percent
1	Emily	149,420	1.2525	26	Megan	51,141	0.4287	51	Jordan	31,433	0.2635	76	Gabriella	23,812	0.1996
2	Madison	123,729	1.0372	27	Jasmine	50,978	0.4273	52	Mary	31,322	0.2626	77	Riley	23,749	0.1991
3	Hannah	110,081	0.9228	28	Rachel	49,896	0.4183	53	Rebecca	31,228	0.2618	78	Autumn	23,686	0.1985
4	Emma	106,428	0.8921	29	Hailey	49,671	0.4164	54	Katelyn	31,008	0.2599	79	Jada	23,652	0.1983
5	Ashley	91,644	0.7682	30	Morgan	48,454	0.4062	55	Andrea	30,873	0.2588	80	Leah	23,585	0.1977
6	Abigail	89,848	0.7532	31	Destiny	47,382	0.3972	56	Kaylee	30,705	0.2574	81	Lillian	22,787	0.191
7	Alexis	89,512	0.7503	32	Julia	47,027	0.3942	57	Paige	30,340	0.2543	82	Jacqueline	22,399	0.1878
8	Olivia	88,971	0.7458	33	Jennifer	46,602	0.3906	58	Gabrielle	30,001	0.2515	83	Bailey	22,324	0.1871
9	Samantha	88,669	0.7433	34	Kaitlyn	45,779	0.3837	59	Madeline	29,860	0.2503	84	Melissa	22,245	0.1865
10	Sarah	85,747	0.7188	35	Katherine	43,231	0.3624	60	Ella	29,493	0.2472	85	Marissa	22,185	0.186
11	Elizabeth	84,242	0.7062	36	Haley	42,392	0.3554	61	Michelle	29,271	0.2454	86	Shelby	22,141	0.1856
12	Alyssa	75,085	0.6294	37	Alexandra	40,837	0.3423	62	Trinity	29,187	0.2447	87	Ariana	21,713	0.182
13	Grace	72,180	0.6051	38	Nicole	40,088	0.336	63	Kimberly	29,182	0.2446	88	Isabel	21,585	0.1809
14	Isabella	70,749	0.5931	39	Mia	38,674	0.3242	64	Sara	28,750	0.241	89	Maya	21,480	0.1801
15	Lauren	69,329	0.5812	40	Savannah	38,608	0.3236	65	Zoe	28,542	0.2393	90	Courtney	21,215	0.1778
16	Jessica	69,240	0.5804	41	Maria	37,221	0.312	66	Caroline	27,347	0.2292	91	Audrey	21,054	0.1765
17	Taylor	68,290	0.5724	42	Ava	36,374	0.3049	67	Kylie	27,339	0.2292	92	Leslie	20,942	0.1755
18	Brianna	65,570	0.5496	43	Mackenzie	36,195	0.3034	68	Amber	27,210	0.2281	93	Claire	20,864	0.1749
19	Kayla	65,541	0.5494	44	Allison	35,998	0.3018	69	Vanessa	26,925	0.2257	94	Angela	20,689	0.1734
20	Anna	59,154	0.4959	45	Amanda	35,556	0.2981	70	Sierra	26,213	0.2197	95	Sofia	20,439	0.1713
21	Victoria	56,048	0.4698	46	Stephanie	35,253	0.2955	71	Alexa	25,551	0.2142	96	Jocelyn	20,156	0.169
22	Sophia	55,346	0.4639	47	Brooke	33,302	0.2792	72	Lily	25,513	0.2139	97	Evelyn	20,135	0.1688
23	Natalie	53,828	0.4512	48	Makayla	32,479	0.2723	73	Danielle	25,478	0.2136	98	Catherine	20,110	0.1686
24	Sydney	53,414	0.4477	49	Jenna	32,047	0.2686	74	Erin	24,405	0.2046	99	Aaliyah	20,100	0.1685
25	Chloe	51,266	0.4297	50	Faith	31,923	0.2676	75	Angelina	24,238	0.2032	100	Mariah	20,082	0.1683

Note: No., number.

Table 4. SSA data for the 100 least popular female names for the period of 2000-2005 (number, percent of total, and rank).

Rank	Name	No.	Percent	Rank	Name	No.	Percent	Rank	Name	No.	Percent	Rank	Name	No.	Percent
901	Kacie	1,319	0.0111	926	Shawna	1,145	0.0096	951	Aryana	1,026	0.0086	976	Yessenia	951	0.008
902	Casandra	1,309	0.011	927	Katy	1,143	0.0096	952	Darlene	1,023	0.0086	977	Amiyah	948	0.0079
903	Jackeline	1,304	0.0109	928	Berenice	1,138	0.0095	953	Unique	1,022	0.0086	978	Jazmyne	937	0.0079
904	Joslyn	1,299	0.0109	929	Galilea	1,130	0.0095	954	Alexys	1,021	0.0086	979	Brionna	922	0.0077
905	Amina	1,276	0.0107	930	Candice	1,119	0.0094	955	Sanaa	1,017	0.0085	980	Alex	919	0.0077
906	Makena	1,273	0.0107	931	Sherlyn	1,114	0.0093	956	Jaylyn	1,009	0.0085	981	Taniyah	902	0.0076
907	Ashtyn	1,243	0.0104	932	Shreya	1,113	0.0093	957	Roxana	1,003	0.0084	982	Chyna	892	0.0075
908	Joelle	1,238	0.0104	933	Luna	1,106	0.0093	958	Jalynn	1,002	0.0084	983	Meaghan	877	0.0074
909	Kellie	1,233	0.0103	934	Natalee	1,104	0.0093	959	Silvia	1,000	0.0084	984	Melinda	875	0.0073
910	Citlali	1,219	0.0102	935	Libby	1,103	0.0092	960	Kinsey	996	0.0083	985	Lacie	871	0.0073
911	Lina	1,211	0.0102	936	Hillary	1,100	0.0092	961	Dianna	996	0.0083	986	Amelie	870	0.0073
912	Sky	1,208	0.0101	937	Yoselin	1,091	0.0091	962	Bryana	996	0.0083	987	Lucille	849	0.0071
913	Jana	1,208	0.0101	938	Maliyah	1,089	0.0091	963	Mira	995	0.0083	988	Kelsi	839	0.007
914	Taya	1,204	0.0101	939	Rachelle	1,085	0.0091	964	Baby	994	0.0083	989	Lacy	818	0.0069
915	Jaliyah	1,193	0.01	940	Roselyn	1,077	0.009	965	Reanna	991	0.0083	990	Maegan	803	0.0067
916	Giana	1,193	0.01	941	Loren	1,073	0.009	966	Iyanna	988	0.0083	991	Sarina	803	0.0067
917	Christy	1,187	0.01	942	Areli	1,057	0.0089	967	Maleah	987	0.0083	992	Kristine	793	0.0066
918	Anjali	1,175	0.0098	943	Keyla	1,057	0.0089	968	Kalyn	979	0.0082	993	Sheridan	792	0.0066
919	Kaci	1,174	0.0098	944	Celina	1,055	0.0088	969	Lainey	974	0.0082	994	Mina	790	0.0066
920	Jaylene	1,173	0.0098	945	Isabell	1,055	0.0088	970	Delia	969	0.0081	995	Phoenix	790	0.0066
921	Yareli	1,167	0.0098	946	Camilla	1,047	0.0088	971	Campbell	967	0.0081	996	Chandler	788	0.0066
922	Johana	1,157	0.0097	947	Kayden	1,047	0.0088	972	Miya	965	0.0081	997	Jeanette	787	0.0066
923	Rubi	1,155	0.0097	948	Samira	1,047	0.0088	973	Rowan	960	0.008	998	Allyssa	784	0.0066
924	Saniya	1,152	0.0097	949	Chanel	1,040	0.0087	974	Natalya	954	0.008	999	Kimora	781	0.0065
925	Sally	1,151	0.0096	950	Drew	1,034	0.0087	975	Myra	951	0.008	1000	Jacklyn	781	0.0065

Note: No., number.

Table 5. Example of the energy values computed by the Sound Ruler program for a name that was typed into a text file, converted into sound by a text-to-speech program (LH Michelle voice), played through a speaker, recorded by a microphone, and converted into a sound file. All procedures were done on the same computer. An oscillogram of the experiment is shown in Figure 2. Although it was expected that the energies of each computer vocalization would be the same, the results showed that the energies of individual vocalizations varied by 3.3% from the average.

	Name (Vocalization Sample)				
Energy for Section:	Jacob (1)	Jacob (2)	Jacob (3)	Average Energy	Std. Dev.
Ener_0-10_Beg	0.0019196	0.0008048	0.0015001		
Ener_10-50_Beg	0.96074	0.83141	0.89298		
Ener_50-90_Beg	5.9393	6.695	5.9661		
Ener_90-Peak_Beg	0.1354	0.40722	0.67015		
Ener_Peak-90_End	0.21996	0.53212	0.48049		
Ener_90-50_End	2.8608	2.4159	2.4031		
Ener_50-10_End	0.043746	0.12446	0.051577		
Ener_10-0_End	0.0055235	0.0027707	0.0016937		
Total Energy	10.1673891	11.0096855	10.4675908	10.5482218	0.348561
PeakTime (seconds)	3.4532	4.5785	5.6969		

Notes: Ener_0-10_Beg, energy between initial 0-10% peak amplitude; Ener_10-50_Beg; energy between initial 10-50% peak amplitude; Ener_50-90_Beg, energy between initial 50-90% peak amplitude; Ener_90-Peak_Beg, energy between initial 90%-peak amplitude; Ener_Peak-90_End, energy between final peak-90% amplitude; Ener_90-50_End, energy between final 90-50% peak amplitude; Ener_50-10_End, energy between final 50-10% peak amplitude; Ener_10-0_End, energy between final 10-0% peak amplitude.

Wade Research Foundation Reports (2007) 4 (6)

Table 6. Average energies (± std. dev.)[a] for the 100 most popular male names, on the SSA list of 1,000 most popular names for 2000-2005, as determined by the Sound Ruler program.

Rank	Name	Avg. Energy	Std. Dev.	Rank	Name	Avg. Energy	Std. Dev.	Rank	Name	Avg. Energy	Std. Dev.	Rank	Name	Avg. Energy	Std. Dev.
1	Jacob	13.03	1.11	26	Benjamin	39.48	4.67	51	Mason	35.45	1.99	76	Richard	19.79	0.26
2	Michael	21.58	0.82	27	Nathan	44.52	3.22	52	Jackson	14.81	1.03	77	Julian	23.30	0.37
3	Joshua	4.76	0.24	28	Austin	32.46	0.57	53	Eric	15.88	0.49	78	Chase	13.09	0.53
4	Matthew	18.06	0.50	29	Noah	36.44	0.40	54	Brian	21.33	2.77	79	Patrick	11.98	0.37
5	Andrew	7.41	0.71	30	Logan	48.98	0.14	55	Juan	19.84	0.61	80	Blake	16.56	0.36
6	Christopher	8.92	0.18	31	Jose	33.50	0.37	56	Adam	15.82	0.85	81	Owen	14.75	0.28
7	Joseph	26.44	2.74	32	Kevin	44.07	0.95	57	Charles	11.44	0.43	82	Sebastian	16.30	0.69
8	Daniel	27.80	0.94	33	Robert	28.98	0.14	58	Luis	33.05	1.77	83	Jayden	20.23	0.51
9	Nicholas	37.02	2.46	34	Gabriel[b]	58.78	4.46	59	Aidan	18.47	0.39	84	Jared	14.29	0.54
10	Ethan	14.25	1.21	35	Thomas	48.44	2.32	60	Gavin	18.71	0.70	85	Antonio	48.49	11.65
11	William	37.73	4.89	36	Caleb	29.05	1.53	61	Sean	8.48	0.33	86	Jeremiah	22.41	0.15
12	Anthony	39.97	6.34	37	Jordan	36.58	3.50	62	Alex	7.85	0.05	87	Trevor	11.68	0.49
13	Ryan	22.11	0.90	38	Hunter	25.33	0.56	63	Nathaniel	28.34	0.53	88	Miguel	17.21	0.08
14	David	18.73	1.26	39	Cameron	25.55	3.22	64	Carlos	20.73	0.82	89	Diego	25.62	0.75
15	Tyler	14.44	0.21	40	Elijah	24.05	1.19	65	Bryan	16.53	0.14	90	Xavier	20.42	1.10
16	John	13.35	0.56	41	Jason	16.70	0.77	66	Ian	13.69	0.26	91	Aiden	18.28	0.82
17	Alexander	23.32	0.70	42	Kyle	12.18	0.53	67	Jesus	8.48	0.44	92	Jesse	8.60	0.40
18	James	20.26	0.83	43	Jack	9.31	0.19	68	Steven	14.97	0.57	93	Dominic	33.50	1.41
19	Brandon	19.17	0.89	44	Connor	12.33	0.45	69	Adrian	29.97	0.93	94	Alejandro	23.52	0.48
20	Zachary	20.52	0.50	45	Aaron	14.31	0.36	70	Timothy	20.20	0.30	95	Hayden	17.87	0.27
21	Jonathan	18.04	0.58	46	Isaiah	15.35	0.65	71	Lucas	14.37	0.24	96	Garrett	11.37	0.41
22	Dylan	16.55	0.26	47	Luke	23.63	0.82	72	Cole	30.32	0.46	97	Jaden	11.81	0.08
23	Christian	14.53	0.21	48	Evan	12.68	0.43	73	Cody	20.36	0.84	98	Mark	9.31	0.06
24	Samuel	18.53	0.35	49	Angel	22.38	0.22	74	Seth	4.90	0.32	99	Jake	12.79	0.53
25	Justin	16.02	0.59	50	Isaac	9.23	0.31	75	Devin	19.37	0.18	100	Victor	9.98	0.09

Note: [a]Average of 3 samples for each name; [b]name with highest average energy value of all male names.

Wade Research Foundation Reports (2007) 4 (6)

Table 7. Average energies (± std. dev.)[a] for the 100 least popular male names, on the SSA list of 1,000 most popular names for 2000-2005, as determined by the Sound Ruler program.

Rank	Name	Avg. Energy	Std. Dev.	Rank	Name	Avg. Energy	Std. Dev.	Rank	Name	Avg. Energy	Std. Dev.	Rank	Name	Avg. Energy	Std. Dev.
901	Heriberto	24.75	0.62	926	Darrin	20.29	0.10	951	Kent	15.29	0.61	976	Vakentin	30.83	0.49
902	Ean	18.26	0.83	927	Zavier	44.24	1.47	952	Glen	13.45	0.26	977	Mariano	30.56	1.92
903	Layton	26.56	0.61	928	Stuart	11.49	0.35	953	Ethen	11.61	0.12	978	Pierre	17.45	1.13
904	Stephon	10.34	1.44	929	Marques	9.88	0.21	954	Justyn	10.60	0.51	979	Rocky	14.50	1.05
905	Jagger	8.29	0.13	930	Trevion	24.74	0.61	955	Syed	12.39	0.24	980	Kyan	14.69	0.55
906	Zain	11.30	0.27	931	Samson	13.89	0.49	956	Konner	13.37	0.17	981	Cannon	18.92	0.22
907	Cristobal	13.97	0.53	932	Khalid	21.90	0.53	957	Turner	14.51	0.10	982	Mathias	16.41	0.52
908	Yosef	5.88	1.33	933	Santino	20.51	0.86	958	Jamil	22.61	1.04	983	Freddie	14.10	2.51
909	Simeon	22.04	0.41	934	Forrest	21.52	0.49	959	Zack	5.78	0.16	984	Kyree	10.28	0.05
910	Raymundo	21.21	0.73	935	Adriel	12.23	0.31	960	Bronson	15.01	0.27	985	Ryland	18.36	0.21
911	Dwight	9.38[b]	0.04[c]	936	Giovani	23.37	0.39	961	Sabastian	12.06	0.31	986	Konnor	13.97	0.07
912	Jovanni	20.28	0.81	937	Gannon	18.25	0.29	962	Vernon	20.33	0.34	987	Austyn	17.80	0.82
913	Jamir	43.03	1.91	938	Kurtis	13.77	0.50	963	Kanye	10.08	0.20	988	Kaeden	15.05	0.33
914	Cohen	13.57	0.50	939	Latrell	20.35	0.77	964	Sullivan	14.36	3.20	989	Rex	6.24	0.05
915	Gino	17.61	0.98	940	Ulysses	47.28	3.34	965	Immanuel	44.40	0.53	990	Jahiem	26.86	0.69
916	Guy[d]	2.76	0.04	941	Cason	11.00	0.13	966	Cash	7.09	0.07	991	Matthais	14.38	0.09
917	Damarion	25.87	0.52	942	Cael	12.84	0.42	967	Eliseo	18.11	0.10	992	Soren	19.32	0.53
918	Trever	10.45	0.37	943	Jakobe	21.78	1.76	968	Jordyn	26.99	0.06	993	Joan	15.00	0.15
919	Andreas	25.87	0.33	944	Carlton	14.70	0.36	969	Darrion	21.94	0.64	994	Mitchel	8.32	0.51
920	Malakai	22.71	0.40	945	Yair	13.10	0.65	970	Ryker	9.60	0.06	995	Devante	16.34	0.46
921	Benny	16.48	0.17	946	Kory	13.99	0.59	971	Enzo	14.47	0.60	996	Garett	10.61	0.05
922	Rahul	12.08	0.21	947	Clifton	16.93	0.13	972	Jevon	15.65	0.37	997	Maximo	26.82	0.86
923	Bradyn	20.95	0.92	948	Shemar	20.59	0.75	973	Kamari	36.92	0.56	998	Kelly	16.64	0.60
924	Bret	5.94	0.15	949	Colt	17.29	0.22	974	Yusuf	11.90	0.16	999	Lonnie	27.53	0.43
925	Avdan	18.89	0.23	950	Jovanny	20.30	0.75	975	Niko	14.17	0.14	1,000	Terence	16.53	2.15

Note: Avg. of [a]3 or [b]2 samples for each name; [c]difference between avg. and measured energy values; [d]lowest avg. energy value of all male names.

Table 8. Average energies (± std. dev.)[a] for the 100 most popular female names, on the SSA list of 1,000 most popular names for 2000-2005, as determined by the Sound Ruler program.

Rank	Name	Avg. Energy	Std. Dev.	Rank	Name	Avg. Energy	Std. Dev.	Rank	Name	Avg. Energy	Std. Dev.	Rank	Name	Avg. Energy	Std. Dev.
1	Emily	24.45	0.64	26	Megan	16.12	1.11	51	Jordan	29.49	0.83	76	Gabriella	33.43	1.37
2	Madison	26.22	4.48	27	Jasmine	24.01	0.55	52	Mary	18.15	0.45	77	Riley	16.05	0.25
3	Hannah	14.28	0.14	28	Rachel	23.59	2.00	53	Rebecca	14.34	0.10	78	Autumn	9.25	0.26
4	Emma	20.45	1.43	29	Hailey	23.32	0.88	54	Katelyn	21.61	0.68	79	Jada	9.75	0.13
5	Ashley	5.29	0.12	30	Morgan	22.72	0.59	55	Andrea	14.53	0.60	80	Leah	44.58	2.14
6	Abigail	23.93	2.11	31	Destiny	19.16	0.20	56	Kaylee	28.66	1.77	81	Lillian	26.83	0.73
7	Alexis	26.82	1.70	32	Julia	17.48	0.05	57	Paige	24.94	1.07	82	Jacqueline	22.78	1.53
8	Olivia	26.21	0.99	33	Jennifer	19.93	0.84	58	Gabrielle	32.02	5.43	83	Bailey	21.95	0.37
9	Samantha	22.66	1.66	34	Kaitlyn	20.33	0.27	59	Madeline	24.38	1.19	84	Melissa	19.54	1.39
10	Sarah	11.02	0.39	35	Katherine	15.03	0.26	60	Ella	7.13	0.19	85	Marissa	19.35	0.34
11	Elizabeth	19.65	0.16	36	Haley	24.05	0.87	61	Michelle	17.01	1.21	86	Shelby	16.01	0.36
12	Allysa	19.86	2.31	37	Alexandra	24.53	1.44	62	Trinity	24.94	0.19	87	Ariana	38.99	1.64
13	Grace	25.05	0.89	38	Nicole	33.94	0.93	63	Kimberly	21.07	0.74	88	Isabel	16.45	0.88
14	Isabella	16.29	0.39	39	Mia	22.29	1.12	64	Sarah	7.81	0.12	89	Maya	11.82	0.35
15	Lauren	28.88	2.02	40	Savannah	15.58	0.37	65	Zoe	9.93	0.32	90	Courtney	17.26	0.66
16	Jessica	10.18	0.15	41	Maria	32.83	2.81	66	Caroline	20.97	1.56	91	Audrey	9.67	0.32
17	Taylor	21.02	0.74	42	Ava	7.44	0.09	67	Kylie	18.29	1.46	92	Leslie	17.25	0.88
18	Brianna	21.40	1.12	43	Mackenzie	27.98	3.96	68	Amber	13.39	0.46	93	Claire	16.68	0.56
19	Kayla	17.67	0.55	44	Allison	17.93	0.53	69	Vanessa	15.14	1.43	94	Angela	14.42	0.25
20	Anna	17.56	1.10	45	Amanda	26.88	2.74	70	Sierra	14.69	0.62	95	Sofia	20.15	0.66
21	Victoria	26.15	0.21	46	Stephanie	12.58	0.54	71	Alexa	9.40	0.11	96	Jocelyn	19.02	0.91
22	Sophia	14.13	1.53	47	Brooke	16.55	0.05	72	Lily	21.04	0.32	97	Evelyn	27.02	1.42
23	Natalie	43.23	1.00	48	Makayla	39.59	2.95	73	Danielle	39.00	7.36	98	Catherine	18.41	0.72
24	Sydney	21.11	0.57	49	Jenna	20.83	0.83	74	Erin	19.29	0.71	99	Aaliyah	24.94	1.92
25	Chloe	19.20	0.45	50	Faith	13.57	0.47	75	Angelina[b]	51.07	2.64	100	Mariah	20.41	3.26

Note: [a]Average of 3 samples for each name. [b]Name with highest average energy value of all female names.

Wade Research Foundation Reports (2007) 4 (6)

Table 9. Average energies (± std. dev.)[a] for the 100 least popular female names, on the SSA list of 1,000 most popular names for 2000-2005, as determined by the Sound Ruler program.

Rank	Name	Avg. Energy	Std. Dev.	Rank	Name	Avg. Energy	Std. Dev.	Rank	Name	Avg. Energy	Std. Dev.	Rank	Name	Avg. Energy	Std. Dev.
901	Kacie	11.58	0.10	926	Shawna	14.66	0.15	951	Aryana	16.74	1.12	976	Yessenia	25.64	0.93
902	Casandra	11.27	1.65	927	Katy	18.93	1.43	952	Darlene	15.14	8.13	977	Amiyah	17.55	0.17
903	Jackeline	21.97	1.21	928	Berenice	20.66	0.27	953	Unique	18.96	0.96	978	Jazmyne	13.46	0.27
904	Joslyn	26.78	0.93	929	Galilea	34.55	0.61	954	Alexys	30.82	1.33	979	Brionna	13.54	0.15
905	Amina	31.81	1.14	930	Candice	19.30	0.54	955	Sanaa	11.64	0.15	980	Alex	7.49	0.07
906	Makena	34.39	0.26	931	Sherlyn	29.14	0.86	956	Jaylyn	26.38	0.93	981	Taniyah	18.90	0.71
907	Ashtyn	22.84	1.36	932	Shreya	6.04	3.42	957	Roxana	13.51	0.16	982	Chyna	13.55	0.28
908	Joelle	17.70	0.43	933	Luna	19.62	0.16	958	Jalynn	21.08	0.35	983	Meaghan	14.85	0.69
909	Kellie	17.85	0.62	934	Natalee	23.87	0.96	959	Silvia	18.74	0.60	984	Melinda	34.14	0.67
910	Citlali	31.02	2.20	935	Libby	22.42	0.61	960	Kinsey	13.70	0.17	985	Lacie	22.75	0.25
911	Lina	27.22	0.34	936	Hillary	27.64	1.80	961	Dianna	14.23	0.30	986	Amelie	32.58	1.94
912	Sky	2.97	0.77	937	Yoselin	29.03	1.09	962	Bryana	14.94	0.09	987	Lucille	19.77	0.49
913	Jana	12.28	0.42	938	Maliyah	35.47	0.18	963	Mira	7.41	5.95	988	Kelsi	9.63	0.25
914	Taya	7.02	0.07	939	Rachelle	12.11	0.18	964	Baby	16.35	0.58	989	Lacy	23.88	0.67
915	Jaliyah	22.85	0.36	940	Roselyn	26.93	0.48	965	Reanna	19.45	0.24	990	Maegan	17.07	0.36
916	Giana	18.24	0.22	941	Loren	26.26	1.25	966	Iyanna	17.94	1.49	991	Sarina	16.35	0.21
917	Christy	14.75	0.11	94	Areli	22.85	0.95	967	Maleah	37.88	1.49	992	Kristine	28.67	0.49
918	Anjali	25.05	1.28	943	Keyla	12.98	0.30	968	Kalyn	21.15	0.46	993	Sheridan	14.32	0.20
919	Kaci	7.41	0.23	944	Celina	17.12	0.88	969	Lainey	36.05	1.84	994	Mina[b]	0.65	0.1
920	Jaylene	34.60	0.56	945	Isabell	15.81	0.71	970	Delia	12.45	0.20	995	Phoenix	21.08	0.37
921	Yareli	25.43	0.20	946	Camilla	14.47	0.57	971	Campbell	13.38	0.18	996	Chandler	17.08	0.08
922	Johanna	15.59	0.38	947	Kayden	18.48	0.49	972	Miya	8.69	3.13	997	Jeanette	16.68	0.63
923	Ruby	20.57	0.78	948	Samira	19.27	0.43	973	Rowan	14.87	0.14	998	Allyssa	20.36	1.71
924	Saniya	18.03	0.54	949	Chanel	17.47	0.61	974	Natalya	17.20	0.64	999	Kimora	20.87	0.77
925	Sally	13.90	0.87	950	Drew	19.13	0.14	975	Myra	12.56	0.11	1,000	Jacklyn	20.57	0.30

Note: [a]Average of 3 samples for each name. [b]Name with least average energy value of all female names.

Table 10. Statistical parameters of acoustic energies (V^2•sec) for groups of names.[a,b]

Statistic:	Most Popular Male Names:	Least Popular Male Names:	Most Popular Female Names:	Least Popular Female Names:
Name Rank[c]	1-100	901-1000	1-100	901-1000
Range of Energies	5-59	3-47	5-51	1-38
Median Value	19	16	20	18
Grand Average[d]	21.13[h]	17.65[h]	20.91	19.30
SD[e]	10.78	8.26	8.24	7.63
SEM[f]	1.08	0.83	0.82	0.76
N[g]	100	100	100	100

Note: [a]Average energy values were calculated from samples of 3 energy values for each name; [b]units of energy are Volts^2•second (V^2•sec); [c]rank in list of SSA's list of the 1000 most popular baby names for 2000-2005; [d]Grand Average, average of all average energy values for a group of 100 names; [e]SD, standard deviation; [f]SEM, standard error of the mean (SD/$\sqrt{N}$); [g]N, number of samples; [h]average energy values not normally distributed (see Figures 5-6 histograms).