The Test Data Collection for Word Similarity Evaluation

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1 Introduction

The document is prepared to provide a formal dataset to evaluate and compare the performance of a word similarity/relatedness measure with existing word similarity measures studied in NLP (Natural Language Processing). The original data (i.e., the word pairs and human-scored similarity value) come from [1]. We compute the other existing similarities through the web interface provided by [2]. The web interface supports various measures including Path length [3], Leacock & Chodorow [4], Wu & Palmer [5], Resnik [6], Hirst & St.Onge [7], Jiang & Conrath [8], Extended Gloss Overlaps [9], Lin [10], Gloss Vector [2], and pairwise Gloss Vector [2]. It is noted that most of the descriptions below about the word pairs and similarity measures are copied from [1] and [2].

2 Word Pairs and Similarity Measures

2.1 Word Pairs

The word pairs collection contains two sets of English word pairs along with human-assigned similarity judgments. The collection can be used to train and/or test computer algorithms implementing semantic similarity measures (i.e., algorithms that numerically estimate similarity of natural language words). The first set (**set1**) contains 153 word pairs along with their similarity scores assigned by 13 subjects. The second set (**set2**) contains 200 word pairs, with their similarity assessed by 16 subjects. Subjects' names have been replaced by ordinal numbers (1..13, or 1..16) to protect their privacy; identical numbers in the two sets do not necessarily correspond to the same individual. All the subjects in both experiments possessed near-native command of English. Their instructions were to estimate the *relatedness* of the words in pairs on a scale from 0 (totally unrelated words) to 10 (very much related or identical words) [1]. Among the 353 pairs, this document contains only 323 pairs after removing some meaningless pairs (e.g., FBI, OPEC for abbreviation) in our own research.

2.2 Similarity Measures

A word similarity measure (we call it as a lexical similarity measure [11]) quantifies the commonality between individual words. A lexical similarity measure falls into lexical form (syntactic information only)-based ones (in short, syntactic measure) and lexical semantics-based ones (in short, semantic measure). The formal syntactic measures solely use the syntactic information only such as letters/alphabets or the length of a word. Often used measures (in schema matching field and others) include affix (or prefix and suffix), n-gram (typical ones are Tanimoto metric and Trigram), Edit distance, and soundex. They are less accurate to accommodate the real semantics behind a word, but still useful when no semantics information (e.g., thesaurus or dictionary) is available and when abbreviations/acronyms are popular. The latter semantic measures are incorporating the semantics or relationships among words with support of a formal lexical knowledge resources (e.g., dictionary, thesaurus, and corpus) [11]. Some of existing semantic measures (which are used to generate the formal dataset) are listed and described below.

- **path** (Path length [3]) A simple node-counting scheme. The relatedness score is inversely proportional to the number of nodes along the shortest path between the synsets. The shortest possible path occurs when the two synsets are the same, in which case the length is 1. Thus, the maximum relatedness value is 1.

- **lch** (Leacock & Chodorow [4]) The relatedness measure proposed by Leacock and Chodorow is $-log(\mathrm{length}/(2 \times \mathrm{D}))$, where length is the length of the shortest path between the two synsets (using node-counting) and D is the maximum depth of the taxonomy.

  The fact that the lch measure takes into account the depth of the taxonomy in which the synsets are found means that the behavior of the measure is profoundly affected by the presence or absence of a unique root node. If there is a unique root node, then there are only two taxonomies: one for nouns and one for verbs. All nouns, then, will be in the same taxonomy and all verbs will be in the same taxonomy. D for the noun taxonomy will be somewhere around 18, depending upon the version of WordNet, and for verbs, it will be 14. If the root node is not being used, however, then there are nine different noun taxonomies and over 560 different verb taxonomies, each with a different value for D.

  If the root node is not being used, then it is possible for synsets to belong to more than one taxonomy. For example, the synset containing turtledove#n#2 belongs to two taxonomies: one rooted at group#n#1 and one rooted at entity#n#1. In such a case, the relatedness is computed by finding the LCS that results in the shortest path between the synsets. The value of D, then, is the maximum depth of the taxonomy in which the LCS is found. If the LCS belongs to more than one taxonomy, then the taxonomy with the greatest maximum depth is selected (i.e., the largest value for D).

- **wup** (Wu & Palmer [5]) The Wu & Palmer measure calculates relatedness by considering the depths of the two synsets in the WordNet taxonomies, along with the depth of the LCS. The formula is $\mathrm{score} = 2 \times depth(\mathrm{lcs})/(depth(\mathrm{s}_1) + depth(\mathrm{s}_2))$. This means that $0 < \mathrm{score} \leq 1$. The score can never be zero because the depth of the LCS is never zero (the depth of the root of a taxonomy is one). The score is one if the two input synsets are the same.

- **res** (Resnik [6]) The related value is equal to the information content (IC) of the Least Common Subsumer (LCS) (most informative subsumer). This means that the value will always be greater-than or equal-to zero. The upper bound on the value is generally quite large and varies depending upon the size of the corpus used to determine information content values. To be precise, the upper bound should be ln (N) where N is the number of words in the corpus.

- **hso** (Hirst & St.Onge [7]) his measure works by finding lexical chains linking the two word senses. There are three classes of relations that are considered: extra-strong, strong, and medium-strong. The maximum relatedness score is 16.

- **jcn** (Jiang & Conrath [8]) The relatedness value returned by the jcn measure is equal to $1/jcn\_distance$, where jcn_distance is equal to $IC(\text{synset}_1)+IC(\text{synset}_2)-2\times IC(\text{lcs})$.

  There are two special cases that need to be handled carefully when computing relatedness; both of these involve the case when jcn_distance is zero.

  In the first case, we have $ic(\text{synset}_1) = ic(\text{synset}_2) = ic(\text{lcs}) = 0$. In an ideal world, this would only happen when all three concepts, viz. synset1, synset2, and lcs, are the root node. However, when a synset has a frequency count of zero, we use the value 0 for the information content. In this first case, we return 0 due to lack of data.

  In the second case, we have $ic(\text{synset}_1)+ic(\text{synset}_2) = 2*ic(\text{ics})$. This is almost always found when synset1 = synset2 = lcs (i.e., the two input synsets are the same). Intuitively this is the case of maximum relatedness, which would be infinity, but it is impossible to return infinity. Insteady we find the smallest possible distance greater than zero and return the multiplicative inverse of that distance.

- **resk** (Extended Gloss Overlaps [9]) The Extended Gloss Overlaps measure works by finding overlaps in the glosses of the two synsets. The relatedness score is the sum of the squares of the overlap lengths. For example, a single word overlap results in a score of 1. Two single word overlaps results in a score of 2. A two word overlap (i.e., two consecutive words) results in a score of 4. A three word overlap results in a score of 9.

- **lin** (Lin [10]) The relatedness value returned by the lin measure is a number equal to $2 \times IC(\text{lcs})/(IC(\text{synset}_1) + IC(\text{synset}_2))$. Where $IC(\text{x})$ is the information content of x. One can observe, then, that the relatedness value will be greater-than or equal-to zero and less-than or equal-to one.

  If the information content of any of either synset1 or synset2 is zero, then zero is returned as the relatedness score, due to lack of data. Ideally, the information content of a synset would be zero only if that synset were the root node, but when the frequency of a synset is zero, we use the value of zero as the information content because of a lack of better alternatives.

- **vec** (Gloss Vector [2]) he Gloss Vector measure works by forming second-order co-occurrence vectors from the glosses or WordNet definitions of concepts. The relatedness of two concepts is determined as the cosine of the angle between their gloss vectors. In order to get

around the data sparsity issues presented by extremely short glosses, this measure augments the glosses of concepts with glosses of adjacent concepts as defined by WordNet relations.

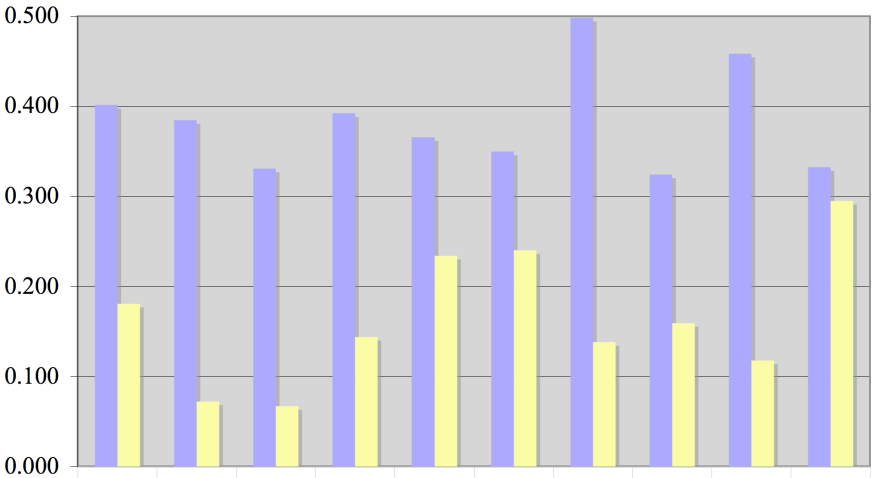
- **vecp** (pairwise Gloss Vector [2]) The Gloss Vector (pairwise) measure is very similar to the "regular" Gloss Vector measure, except in the way it augments the glosses of concepts with adjacent glosses. The regular Gloss Vector measure first combines the adjacent glosses to form one large "super-gloss" and creates a single vector corresponding to each of the two concepts from the two "super-glosses". The pairwise Gloss Vector measure, on the other hand, forms separate vectors corresponding to each of the adjacent glosses (does not form a single super gloss). For example separate vectors will be created for the hyponyms, the holonyms, the meronyms, etc. of the two concepts. The measure then takes the sum of the individual cosines of the corresponding gloss vectors, i.e. the cosine of the angle between the hyponym vectors is added to the cosine of the angle between the hlonym vectors, and so on. From empirical studies, we have found that the regular Gloss Vector measure performs better than the pairwise Gloss Vector measure.

3 Computed Word Similarity

Table 1 at the end of this document summarizes the normalized similarities for every pair. It is noted that some of the measures have no upper bound, we arbitrarily set the limit (e.g., 50 for 'lesk').

4 Basic Analysis

Figure 1 summarizes MSE's and correlations of the measures with the human judgment. Basically, the two metrics (i.e., MSE (mean squared error) and correlation) imply the same intuition that a good similarity measure can quantify similarity/relatedness very close to that by humans. The difference is that correlation is often used in NLP (natural language processing) to compare the performance of a lexical similarity measure, while MSE is often used in machine learning to evaluate the performance of a learner/classifier. In the point of correlation, 'lesk' and 'vec' are very good measures, while 'lch' and 'wup' are very good in the point of MSE as shown in Figure 1, in which former bars indicate to correlation and the latter bars to MSE. To be easy, a new lexical measure is desirable to have greater correlation than that of 'lesk' or 'vec' or have less MSE than that of 'lch' or 'wup'. One may design a new performance metric incorporating both correlation and MSE as 'new metric = correlation / MSE'. For this sense, 'lch' and 'wup' are best having 5.33 and 4.95, respectively (2.22, 5.33, 4.95, 2.72, 1.56, 1.46, 3.60, 2.03, 3.89, 1.13 for 'path' to 'vecp'). In other cases, other measures such as 'misclassifed rate', 'recall', 'precision', 'F-measure', 'overall/accuracy', and so forth are more useful than correlation and MSE.



	path	lch	wup	res	hso	jcn	lesk	lin	vec	vecp
Correlation	0.402	0.384	0.331	0.393	0.366	0.350	0.498	0.324	0.458	0.332
MSE	0.181	0.072	0.067	0.144	0.234	0.240	0.138	0.159	0.118	0.295

Figure 1: MSE and Correlation with Human Judgment

5 Conclusion

The document is prepared to provide a neutral dataset to evaluate the performance of a lexical (word) similarity measure for future works. The dataset consists 11 measures (including human judgment) and 323 pairs. In many research, correlation and MSE with human judgment are used as a standard metric to compare the performance.

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Table 1: List of Word Similarity

Word 1	Word 2	Human	path	lch	wup	res	hso	jcn	lesk	lin	vec	vecp
tiger	tiger	1.000	1.000	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
midday	noon	0.929	1.000	1.003	1.000	0.824	1.000	1.000	0.920	1.000	1.000	0.000
journey	voyage	0.929	0.500	0.785	0.960	0.616	0.250	0.302	0.820	0.823	0.806	0.353
dollar	buck	0.922	1.000	1.003	1.000	0.801	1.000	1.000	1.000	1.000	1.000	0.506
money	cash	0.915	0.333	0.657	0.917	0.558	0.313	0.219	1.000	0.725	0.424	0.197
coast	shore	0.910	0.500	0.785	0.923	0.707	0.250	1.000	1.000	0.966	0.643	0.255
money	cash	0.908	0.333	0.657	0.917	0.558	0.313	0.219	1.000	0.725	0.424	0.197
money	currency	0.904	0.500	0.785	0.957	0.558	0.313	0.692	1.000	0.893	0.507	0.240
football	soccer	0.903	0.500	0.785	0.960	0.824	0.250	0.000	1.000	0.000	0.556	0.162
magician	wizard	0.902	1.000	1.003	1.000	0.945	1.000	1.000	1.000	1.000	1.000	0.353
type	kind	0.897	0.500	0.785	0.957	0.421	0.250	1.000	1.000	0.947	0.344	0.429
gem	jewel	0.896	1.000	1.003	1.000	0.834	1.000	1.000	1.000	1.000	1.000	0.353
car	automobile	0.894	1.000	1.003	1.000	0.481	1.000	1.000	1.000	1.000	1.000	0.712
street	avenue	0.888	0.500	0.785	0.952	0.634	0.250	0.218	1.000	0.776	0.344	0.225
asylum	madhouse	0.887	0.500	0.785	0.957	0.912	0.250	1.000	0.840	0.983	0.769	0.002
boy	lad	0.883	0.500	0.785	0.933	0.599	0.313	0.293	1.000	0.814	0.786	0.034
environment	ecology	0.881	0.500	0.785	0.941	0.547	0.250	0.176	0.580	0.707	0.461	0.021
furnace	stove	0.879	0.125	0.349	0.632	0.198	0.313	0.055	1.000	0.215	0.576	0.019
seafood	lobster	0.870	0.333	0.657	0.875	0.945	0.375	0.000	1.000	0.000	0.403	0.024
mile	kilometer	0.866	0.250	0.567	0.824	0.401	0.250	0.112	1.000	0.530	0.684	0.243
king	queen	0.858	1.000	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.353
murder	manslaughter	0.853	0.333	0.657	0.929	0.678	0.313	0.000	1.000	0.000	0.279	0.101
money	bank	0.850	0.143	0.391	0.667	0.309	0.000	0.111	0.320	0.461	0.354	0.073
computer	software	0.850	0.071	0.173	0.235	0.000	0.313	0.055	1.000	0.000	0.400	0.029
vodka	gin	0.846	0.333	0.657	0.889	0.696	0.313	0.000	1.000	0.000	0.567	0.214

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Table 1 –Continued from previous page

Word 1	Word 2	Human	path	lch	wup	res	hso	jcn	lesk	lin	vec	vecp
planet	star	0.845	0.333	0.657	0.875	0.530	0.313	0.467	1.000	0.861	0.602	0.243
calculation	computation	0.844	1.000	1.003	1.000	0.723	1.000	1.000	1.000	1.000	1.000	0.353
money	dollar	0.842	0.200	0.497	0.846	0.558	0.188	0.223	0.360	0.729	0.177	0.056
law	lawyer	0.838	0.083	0.221	0.267	0.000	0.000	0.065	0.460	0.000	0.395	0.046
championship	tournament	0.836	0.333	0.657	0.889	0.432	0.313	0.055	0.840	0.158	0.611	0.026
weather	forecast	0.834	0.143	0.295	0.250	0.000	0.000	0.056	0.120	0.000	0.131	0.047
seafood	food	0.834	0.500	0.785	0.923	0.561	1.000	0.209	1.000	0.746	0.401	0.008
network	hardware	0.831	0.250	0.567	0.824	0.292	0.250	0.066	0.420	0.324	0.346	0.156
nature	environment	0.831	0.167	0.439	0.667	0.191	0.125	0.100	0.100	0.324	0.193	0.033
man	woman	0.830	0.250	0.567	0.769	0.385	1.000	0.165	1.000	0.601	0.744	0.295
money	wealth	0.827	0.500	0.785	0.941	0.684	0.250	1.000	1.000	0.999	0.413	0.320
news	report	0.816	0.500	0.785	0.941	0.533	0.313	1.000	1.000	0.986	0.610	0.312
war	troops	0.813	0.143	0.295	0.471	0.041	0.000	0.071	0.400	0.068	0.254	0.037
vodka	brandy	0.813	0.333	0.657	0.889	0.696	0.313	0.000	1.000	0.000	0.332	0.117
physics	proton	0.812	0.067	0.151	0.300	0.073	0.000	0.053	0.200	0.086	0.460	0.022
bank	money	0.812	0.143	0.391	0.667	0.309	0.000	0.111	0.320	0.461	0.354	0.069
planet	galaxy	0.811	0.125	0.349	0.632	0.187	0.250	0.053	0.740	0.000	0.558	0.149
stock	market	0.808	0.200	0.400	0.625	0.220	0.250	0.107	0.200	0.371	0.408	0.186
psychology	psychiatry	0.808	0.143	0.391	0.769	0.584	0.000	0.126	0.340	0.648	0.277	0.000
planet	moon	0.808	0.250	0.567	0.824	0.530	0.250	0.359	0.420	0.827	0.916	0.258
planet	constellation	0.806	0.250	0.567	0.800	0.373	0.250	0.053	0.500	0.000	0.468	0.035
credit	card	0.806	0.167	0.439	0.706	0.322	0.125	0.065	0.140	0.324	0.206	0.058
hotel	reservation	0.803	0.091	0.248	0.444	0.115	0.000	0.063	0.060	0.152	0.315	0.029
planet	sun	0.802	0.250	0.567	0.824	0.530	0.250	0.428	1.000	0.850	0.715	0.191
tiger	feline	0.800	0.333	0.657	0.929	0.731	0.375	0.297	1.000	0.845	0.708	0.066
tiger	jaguar	0.800	0.333	0.657	0.933	0.871	0.313	0.396	1.000	0.896	0.888	0.182

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Table 1 –Continued from previous page

Word 1	Word 2	Human	path	lch	wup	res	hso	jcn	lesk	lin	vec	vecp
closet	clothes	0.800	0.125	0.349	0.632	0.198	0.000	0.071	0.100	0.259	0.545	0.013
soap	opera	0.794	0.077	0.196	0.348	0.073	0.000	0.050	0.040	0.000	0.069	0.011
planet	astronomer	0.794	0.167	0.439	0.667	0.193	0.125	0.000	1.000	0.000	0.492	0.200
planet	space	0.792	0.143	0.391	0.588	0.189	0.188	0.092	0.220	0.210	0.164	0.022
movie	theater	0.792	0.143	0.391	0.667	0.137	0.000	0.096	0.580	0.247	0.293	0.035
treatment	recovery	0.791	0.143	0.391	0.700	0.165	0.000	0.078	0.240	0.243	0.331	0.067
liquid	water	0.789	0.500	0.785	0.923	0.470	0.375	1.000	1.000	1.000	0.429	0.156
life	death	0.788	0.333	0.657	0.875	0.536	0.313	0.297	1.000	0.799	0.632	0.119
baby	mother	0.785	0.200	0.497	0.778	0.463	0.188	0.296	0.640	0.753	0.568	0.211
lobster	food	0.781	0.250	0.567	0.800	0.561	0.313	0.000	0.380	0.000	0.211	0.004
cell	phone	0.781	0.333	0.657	0.909	0.721	0.375	0.134	0.740	0.674	0.659	0.039
dollar	yen	0.778	0.250	0.567	0.842	0.672	0.250	0.048	0.920	0.047	0.270	0.167
wood	forest	0.773	1.000	1.003	1.000	0.636	1.000	1.000	1.000	1.000	1.000	0.367
money	deposit	0.773	0.333	0.657	0.917	0.520	0.375	0.068	0.640	0.054	0.335	0.049
television	film	0.772	0.200	0.497	0.800	0.567	0.188	0.308	0.460	0.814	0.330	0.067
psychology	mind	0.769	0.143	0.391	0.667	0.257	0.000	0.093	0.160	0.373	0.263	0.000
game	team	0.769	0.100	0.278	0.471	0.041	0.000	0.088	0.260	0.083	0.262	0.028
admission	ticket	0.769	0.143	0.391	0.667	0.294	0.000	0.060	0.060	0.249	0.130	0.083
profit	loss	0.763	0.167	0.439	0.762	0.505	0.188	0.490	0.200	0.861	0.538	0.079
dividend	payment	0.763	0.333	0.657	0.923	0.573	0.375	0.097	0.980	0.428	0.438	0.016
computer	keyboard	0.762	0.250	0.567	0.842	0.367	0.250	0.080	1.000	0.424	0.480	0.011
boxing	round	0.761	0.200	0.400	0.769	0.562	0.000	0.159	0.060	0.691	0.276	0.034
rock	jazz	0.759	0.333	0.657	0.889	0.834	0.313	0.054	1.000	0.000	0.486	0.197
century	year	0.759	0.333	0.657	0.875	0.281	0.375	0.152	0.600	0.517	0.650	0.000
money	property	0.757	0.333	0.657	0.875	0.544	0.375	0.562	1.000	0.884	0.341	0.031
tennis	racket	0.756	0.111	0.312	0.667	0.230	0.000	0.052	0.260	0.231	0.313	0.135

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Table 1 –Continued from previous page

Word 1	Word 2	Human	path	lch	wup	res	hso	jcn	lesk	lin	vec	vecp
announcement	news	0.756	0.200	0.497	0.750	0.294	0.188	0.114	0.180	0.456	0.175	0.035
day	dawn	0.753	0.333	0.657	0.875	0.281	0.313	0.071	0.340	0.068	0.643	0.762
canyon	landscape	0.753	0.083	0.221	0.421	0.115	0.000	0.056	0.000	0.138	0.043	0.018
food	fruit	0.752	0.111	0.312	0.526	0.112	0.000	0.088	0.680	0.138	0.297	0.008
telephone	communication	0.750	0.083	0.221	0.267	0.000	0.000	0.085	0.380	0.000	0.307	0.061
currency	market	0.750	0.100	0.278	0.471	0.041	0.000	0.077	0.180	0.073	0.291	0.028
psychology	cognition	0.748	0.167	0.439	0.706	0.220	0.188	0.125	0.400	0.408	0.339	0.000
seafood	sea	0.747	0.125	0.349	0.462	0.073	0.000	0.054	0.260	0.089	0.145	0.013
marathon	sprint	0.747	0.091	0.248	0.583	0.165	0.000	0.048	0.040	0.165	0.542	0.005
book	library	0.746	0.333	0.657	0.857	0.408	0.313	0.082	0.600	0.289	0.273	0.179
book	paper	0.746	0.333	0.657	0.889	0.391	0.313	0.129	1.000	0.558	0.635	0.328
psychology	depression	0.742	0.083	0.221	0.421	0.112	0.000	0.053	0.160	0.121	0.269	0.000
media	radio	0.742	0.250	0.567	0.842	0.567	0.313	0.310	0.320	0.815	0.180	0.031
jaguar	cat	0.742	0.500	0.785	0.966	0.871	0.250	1.000	1.000	0.960	0.705	0.065
movie	star	0.738	0.091	0.248	0.476	0.112	0.000	0.067	0.220	0.058	0.241	0.027
dollar	profit	0.738	0.100	0.278	0.471	0.041	0.000	0.063	0.080	0.061	0.198	0.059
bird	crane	0.738	0.250	0.567	0.870	0.612	0.313	0.000	0.360	0.000	0.358	0.023
tiger	cat	0.735	0.500	0.785	0.966	0.871	0.250	0.621	1.000	0.931	0.688	0.074
physics	chemistry	0.735	0.333	0.657	0.917	0.627	0.313	0.477	1.000	0.882	0.367	0.008
country	citizen	0.731	0.111	0.312	0.500	0.115	0.313	0.092	0.460	0.209	0.323	0.049
money	possession	0.729	0.250	0.567	0.800	0.309	0.313	0.212	0.120	0.621	0.167	0.030
jaguar	car	0.727	0.056	0.094	0.320	0.115	0.000	0.067	0.040	0.161	0.109	0.005
cup	drink	0.725	0.200	0.497	0.750	0.497	0.250	0.179	0.600	0.690	0.558	0.188
psychology	health	0.723	0.083	0.221	0.421	0.041	0.000	0.052	0.020	0.051	0.110	0.000
museum	theater	0.719	0.143	0.391	0.667	0.198	0.125	0.065	0.340	0.244	0.147	0.018
summer	drought	0.716	0.250	0.567	0.824	0.281	0.250	0.072	0.040	0.336	0.116	0.057

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Table 1 –Continued from previous page

Word 1	Word 2	Human	path	lch	wup	res	hso	jcn	lesk	lin	vec	vecp
phone	equipment	0.713	0.333	0.657	0.889	0.507	0.375	0.374	1.000	0.826	0.298	0.007
bird	cock	0.710	0.500	0.785	0.952	0.612	0.375	0.266	1.000	0.803	0.655	0.031
tiger	carnivore	0.708	0.250	0.567	0.889	0.639	0.313	0.221	0.180	0.780	0.535	0.020
company	stock	0.708	0.167	0.439	0.706	0.248	0.125	0.138	0.820	0.432	0.385	0.086
stroke	hospital	0.703	0.091	0.248	0.444	0.115	0.000	0.064	0.040	0.000	0.140	0.022
liability	insurance	0.703	0.143	0.391	0.700	0.357	0.000	0.055	0.200	0.054	0.274	0.044
game	victory	0.703	0.143	0.391	0.667	0.137	0.000	0.090	0.160	0.235	0.432	0.150
tiger	animal	0.700	0.250	0.567	0.800	0.434	0.250	0.141	0.160	0.605	0.320	0.024
psychology	anxiety	0.700	0.077	0.196	0.400	0.041	0.000	0.060	0.160	0.058	0.270	0.000
doctor	nurse	0.700	0.333	0.567	0.842	0.645	0.313	0.258	1.000	0.797	0.840	0.200
game	defeat	0.697	0.143	0.391	0.667	0.137	0.000	0.080	0.160	0.216	0.318	0.154
street	block	0.688	0.167	0.439	0.706	0.198	0.125	0.088	0.340	0.303	0.282	0.104
opera	performance	0.688	0.100	0.278	0.444	0.073	0.125	0.064	0.300	0.062	0.379	0.037
money	withdrawal	0.688	0.083	0.221	0.421	0.041	0.000	0.064	0.160	0.062	0.130	0.017
tiger	mammal	0.685	0.167	0.439	0.800	0.494	0.188	0.158	0.180	0.661	0.167	0.012
psychology	fear	0.685	0.077	0.196	0.400	0.041	0.000	0.059	0.060	0.058	0.131	0.000
drug	abuse	0.685	0.200	0.400	0.333	0.000	0.000	0.059	0.140	0.000	0.257	0.028
student	professor	0.681	0.125	0.349	0.588	0.193	0.000	0.082	0.400	0.285	0.211	0.032
football	basketball	0.681	0.333	0.657	0.909	0.689	0.313	0.215	1.000	0.786	0.615	0.206
concert	virtuoso	0.681	0.071	0.173	0.235	0.000	0.000	0.048	0.040	0.000	0.113	0.069
computer	laboratory	0.678	0.111	0.312	0.500	0.115	0.000	0.059	0.040	0.145	0.127	0.017
television	radio	0.677	0.333	0.657	0.917	0.784	0.313	0.571	0.960	0.912	0.464	0.207
love	sex	0.677	0.500	0.785	0.933	0.701	0.250	0.064	1.000	0.234	0.307	0.251
problem	challenge	0.675	0.167	0.439	0.706	0.294	0.125	0.088	0.080	0.353	0.197	0.076
movie	critic	0.673	0.071	0.173	0.235	0.000	0.000	0.059	0.140	0.000	0.174	0.014
bed	closet	0.672	0.333	0.657	0.900	0.553	0.313	0.182	1.000	0.716	0.386	0.045

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Table 1 –Continued from previous page

Word 1	Word 2	Human	path	lch	wup	res	hso	jcn	lesk	lin	vec	vecp
psychology	science	0.671	0.500	0.785	0.952	0.584	0.250	0.293	1.000	0.810	0.429	0.000
lawyer	evidence	0.669	0.083	0.221	0.267	0.000	0.000	0.069	0.300	0.000	0.474	0.028
fertility	egg	0.669	0.083	0.221	0.267	0.000	0.000	0.000	0.040	0.000	0.112	0.031
bishop	rabbi	0.669	0.200	0.497	0.778	0.636	0.188	0.211	0.180	0.770	0.241	0.033
precedent	law	0.665	0.500	0.785	0.933	0.529	0.375	0.193	1.000	0.718	0.514	0.104
minister	party	0.663	0.167	0.439	0.667	0.193	0.125	0.075	0.200	0.266	0.218	0.043
football	tennis	0.663	0.167	0.439	0.815	0.683	0.125	0.174	1.000	0.749	0.176	0.021
professor	doctor	0.662	0.143	0.391	0.700	0.547	0.000	0.289	0.060	0.798	0.209	0.009
psychology	clinic	0.658	0.071	0.173	0.381	0.041	0.000	0.043	0.060	0.000	0.146	0.000
cup	coffee	0.658	0.167	0.439	0.762	0.558	0.125	0.125	0.500	0.609	0.903	0.900
water	seepage	0.656	0.077	0.196	0.250	0.000	0.000	0.054	0.100	0.000	0.117	0.024
government	crisis	0.656	0.143	0.391	0.667	0.137	0.000	0.070	0.100	0.179	0.135	0.031
space	world	0.653	0.200	0.497	0.667	0.191	0.313	0.096	0.400	0.314	0.317	0.233
dividend	calculation	0.648	0.091	0.248	0.444	0.041	0.000	0.056	0.080	0.055	0.167	0.012
victim	emergency	0.647	0.091	0.248	0.421	0.115	0.000	0.053	0.000	0.132	0.122	0.017
luxury	car	0.647	0.063	0.131	0.211	0.000	0.000	0.059	0.080	0.000	0.097	0.011
tool	implement	0.646	0.500	0.785	0.941	0.560	0.250	0.817	1.000	0.920	0.354	0.183
street	place	0.644	0.167	0.439	0.706	0.248	0.188	0.087	0.420	0.279	0.335	0.092
competition	price	0.644	0.125	0.349	0.556	0.259	0.000	0.109	0.120	0.414	0.179	0.061
psychology	doctor	0.642	0.077	0.196	0.455	0.112	0.000	0.054	0.200	0.121	0.277	0.000
gender	equality	0.641	0.125	0.349	0.588	0.191	0.000	0.056	0.120	0.211	0.091	0.017
listing	category	0.638	0.111	0.312	0.500	0.112	0.000	0.084	0.460	0.080	0.198	0.020
video	archive	0.634	0.091	0.248	0.546	0.198	0.000	0.067	0.020	0.161	0.288	0.042
oil	stock	0.634	0.200	0.400	0.609	0.433	0.000	0.093	0.400	0.386	0.185	0.024
discovery	space	0.634	0.111	0.312	0.500	0.041	0.000	0.071	0.060	0.068	0.128	0.024
train	car	0.631	0.167	0.439	0.762	0.438	0.313	0.244	1.000	0.728	0.655	0.055

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Table 1 –Continued from previous page

Word 1	Word 2	Human	path	lch	wup	res	hso	jcn	lesk	lin	vec	vecp
shower	thunderstorm	0.631	0.143	0.391	0.727	0.561	0.000	0.000	0.040	0.000	0.164	0.027
record	number	0.631	0.500	0.785	0.933	0.447	0.375	0.522	1.000	0.851	0.502	0.135
brother	monk	0.627	0.500	0.785	0.941	0.871	0.250	0.067	1.000	0.244	0.429	0.251
production	crew	0.625	0.125	0.349	0.533	0.041	0.000	0.068	0.120	0.062	0.468	0.022
nature	man	0.625	0.250	0.567	0.727	0.191	0.313	0.097	0.320	0.316	0.302	0.047
family	planning	0.625	0.100	0.278	0.471	0.041	0.000	0.073	0.140	0.070	0.389	0.056
disaster	area	0.625	0.111	0.312	0.600	0.248	0.000	0.087	0.200	0.352	0.318	0.032
skin	eye	0.622	0.167	0.439	0.706	0.338	0.125	0.117	1.000	0.498	0.389	0.029
food	preparation	0.622	0.250	0.567	0.727	0.270	0.250	0.134	0.440	0.475	0.270	0.137
preservation	world	0.619	0.143	0.391	0.632	0.248	0.000	0.063	0.080	0.150	0.374	0.017
movie	popcorn	0.619	0.067	0.151	0.222	0.000	0.000	0.000	0.040	0.000	0.177	0.018
lover	quarrel	0.619	0.071	0.173	0.381	0.115	0.000	0.054	0.100	0.000	0.143	0.018
game	series	0.619	0.333	0.657	0.889	0.432	0.313	0.272	1.000	0.746	0.495	0.313
bread	butter	0.619	0.333	0.567	0.800	0.561	0.313	0.158	0.560	0.689	0.535	0.066
dollar	loss	0.609	0.111	0.312	0.500	0.041	0.000	0.076	0.040	0.073	0.125	0.083
weapon	secret	0.606	0.091	0.248	0.444	0.041	0.000	0.064	0.240	0.049	0.176	0.041
precedent	antecedent	0.604	0.167	0.439	0.706	0.294	0.375	0.057	0.240	0.120	0.742	0.324
shower	flood	0.603	0.200	0.400	0.692	0.381	0.188	0.075	0.160	0.416	0.127	0.059
registration	arrangement	0.600	0.167	0.439	0.727	0.230	0.125	0.068	0.200	0.231	0.186	0.104
arrival	hotel	0.600	0.091	0.248	0.444	0.115	0.000	0.057	0.100	0.140	0.244	0.029
announcement	warning	0.600	0.167	0.439	0.706	0.294	0.125	0.086	0.200	0.387	0.243	0.050
game	round	0.597	0.200	0.497	0.818	0.643	0.250	0.184	0.300	0.723	0.264	0.060
baseball	season	0.597	0.067	0.151	0.364	0.041	0.000	0.071	0.500	0.068	0.207	0.041
drink	mouth	0.596	0.200	0.400	0.583	0.317	0.000	0.078	0.280	0.181	0.251	0.097
life	lesson	0.594	0.125	0.349	0.556	0.222	0.000	0.073	0.060	0.289	0.144	0.047
energy	crisis	0.594	0.125	0.349	0.632	0.248	0.000	0.067	0.120	0.275	0.127	0.051

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Table 1 –Continued from previous page

Word 1	Word 2	Human	path	lch	wup	res	hso	jcn	lesk	lin	vec	vecp
king	rook	0.592	0.333	0.657	0.917	0.187	0.313	0.000	1.000	0.000	0.855	0.340
cucumber	potato	0.592	0.250	0.567	0.842	0.808	0.250	0.000	0.300	0.000	0.308	0.031
reason	criterion	0.591	0.125	0.349	0.632	0.222	0.000	0.106	0.200	0.372	0.245	0.042
equipment	maker	0.591	0.100	0.278	0.471	0.115	0.000	0.081	0.180	0.189	0.180	0.005
cup	liquid	0.590	0.167	0.439	0.706	0.484	0.188	0.174	0.500	0.678	0.195	0.039
deployment	withdrawal	0.588	0.111	0.312	0.636	0.165	0.000	0.000	0.120	0.000	0.210	0.005
tiger	zoo	0.587	0.111	0.312	0.500	0.115	0.000	0.047	0.020	0.118	0.037	0.011
precedent	example	0.585	0.500	0.785	0.941	0.601	0.250	0.295	1.000	0.816	0.816	0.304
journey	car	0.585	0.053	0.076	0.182	0.000	0.000	0.085	0.380	0.000	0.417	0.018
smart	stupid	0.581	0.067	0.151	0.222	0.000	1.000	0.000	0.140	0.000	0.332	0.076
plane	car	0.577	0.143	0.391	0.750	0.441	0.313	0.275	1.000	0.752	0.575	0.046
planet	people	0.575	0.100	0.278	0.308	0.000	0.250	0.083	0.260	0.000	0.147	0.016
lobster	wine	0.570	0.100	0.278	0.471	0.270	0.000	0.000	0.200	0.000	0.185	0.006
summer	nature	0.563	0.111	0.312	0.500	0.041	0.000	0.065	0.040	0.063	0.104	0.019
Mars	scientist	0.563	0.091	0.248	0.444	0.115	0.000	0.070	0.200	0.168	0.259	0.013
decoration	valor	0.563	0.083	0.221	0.421	0.041	0.000	0.056	0.020	0.050	0.185	0.034
tiger	fauna	0.562	0.250	0.567	0.800	0.434	0.250	0.141	0.160	0.605	0.182	0.020
psychology	discipline	0.558	0.333	0.657	0.900	0.481	0.375	0.213	0.780	0.720	0.317	0.000
glass	metal	0.556	0.200	0.497	0.667	0.270	0.188	0.105	0.900	0.415	0.387	0.038
alcohol	chemistry	0.554	0.091	0.248	0.286	0.000	0.000	0.059	0.220	0.000	0.248	0.010
disability	death	0.547	0.143	0.391	0.667	0.248	0.000	0.079	0.120	0.329	0.181	0.028
change	attitude	0.544	0.167	0.439	0.667	0.259	0.125	0.128	0.580	0.265	0.448	0.043
territory	surface	0.534	0.167	0.439	0.667	0.257	0.125	0.195	0.340	0.551	0.223	0.022
size	prominence	0.531	0.167	0.439	0.706	0.248	0.125	0.071	0.080	0.263	0.108	0.041
exhibit	memorabilia	0.531	0.111	0.312	0.556	0.222	0.000	0.051	0.020	0.222	0.093	0.006
credit	information	0.531	0.250	0.567	0.800	0.362	0.250	0.127	0.140	0.483	0.245	0.053

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Table 1 –Continued from previous page

Word 1	Word 2	Human	path	lch	wup	res	hso	jcn	lesk	lin	vec	vecp
territory	kilometer	0.528	0.083	0.221	0.421	0.041	0.000	0.066	0.000	0.046	0.049	0.006
man	governor	0.525	0.200	0.497	0.714	0.292	0.188	0.094	0.140	0.314	0.188	0.024
death	row	0.525	0.125	0.349	0.600	0.191	0.000	0.079	0.060	0.213	0.168	0.050
doctor	liability	0.519	0.083	0.221	0.421	0.041	0.000	0.060	0.140	0.048	0.401	0.014
impartiality	interest	0.516	0.111	0.312	0.526	0.112	0.000	0.000	0.040	0.000	0.307	0.018
energy	laboratory	0.509	0.100	0.278	0.400	0.073	0.000	0.073	0.100	0.117	0.092	0.025
secretary	senate	0.506	0.067	0.151	0.222	0.000	0.000	0.052	0.080	0.000	0.098	0.025
death	inmate	0.503	0.091	0.248	0.375	0.073	0.000	0.060	0.100	0.098	0.112	0.056
travel	activity	0.500	0.167	0.439	0.737	0.165	0.125	0.240	1.000	0.497	0.565	0.027
monk	oracle	0.500	0.125	0.349	0.588	0.193	0.000	0.057	0.080	0.217	0.129	0.043
doctor	personnel	0.500	0.083	0.221	0.421	0.041	0.000	0.075	0.140	0.057	0.321	0.025
cup	food	0.500	0.167	0.439	0.667	0.425	0.188	0.154	0.760	0.621	0.237	0.011
journal	association	0.497	0.143	0.391	0.571	0.073	0.000	0.063	0.080	0.073	0.153	0.039
street	children	0.494	0.091	0.248	0.444	0.115	0.000	0.093	0.220	0.211	0.155	0.028
car	flight	0.494	0.125	0.349	0.632	0.198	0.000	0.085	0.240	0.296	0.339	0.087
space	chemistry	0.488	0.167	0.439	0.615	0.041	0.125	0.068	0.180	0.066	0.212	0.025
situation	conclusion	0.481	0.143	0.391	0.700	0.165	0.000	0.096	0.200	0.285	0.314	0.063
tiger	organism	0.477	0.333	0.657	0.857	0.187	0.375	0.098	0.100	0.316	0.151	0.004
word	similarity	0.475	0.111	0.312	0.539	0.257	0.000	0.078	0.280	0.074	0.273	0.019
peace	plan	0.475	0.100	0.278	0.471	0.041	0.000	0.069	0.020	0.066	0.241	0.038
consumer	energy	0.475	0.100	0.278	0.400	0.073	0.000	0.078	0.040	0.124	0.240	0.000
ministry	culture	0.469	0.111	0.312	0.600	0.220	0.000	0.060	0.080	0.249	0.091	0.028
hospital	infrastructure	0.463	0.083	0.221	0.421	0.041	0.125	0.000	0.260	0.000	0.148	0.011
smart	student	0.462	0.067	0.151	0.222	0.000	0.000	0.000	0.120	0.000	0.218	0.027
investigation	effort	0.459	0.250	0.567	0.857	0.344	0.250	0.207	0.200	0.640	0.254	0.031
image	surface	0.456	0.200	0.497	0.750	0.257	0.188	0.122	0.380	0.377	0.455	0.040

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Table 1 –Continued from previous page

Word 1	Word 2	Human	path	lch	wup	res	hso	jcn	lesk	lin	vec	vecp
life	term	0.450	0.333	0.657	0.889	0.564	0.375	0.127	0.760	0.472	0.841	0.267
start	match	0.447	0.250	0.471	0.667	0.534	0.250	0.131	0.280	0.636	0.466	0.073
computer	news	0.447	0.083	0.221	0.267	0.000	0.000	0.058	0.120	0.000	0.247	0.022
board	recommendation	0.447	0.083	0.221	0.421	0.041	0.000	0.071	0.060	0.068	0.162	0.036
lad	brother	0.446	0.200	0.497	0.714	0.193	0.188	0.080	0.200	0.278	0.424	0.268
food	rooster	0.442	0.071	0.173	0.316	0.073	0.000	0.067	0.200	0.109	0.131	0.008
observation	architecture	0.438	0.167	0.439	0.762	0.230	0.125	0.063	0.060	0.266	0.106	0.032
coast	hill	0.438	0.200	0.497	0.714	0.521	0.250	0.188	0.220	0.710	0.237	0.187
deployment	departure	0.425	0.125	0.349	0.667	0.165	0.000	0.000	0.040	0.000	0.086	0.022
benchmark	index	0.425	0.250	0.567	0.857	0.474	0.250	0.000	0.080	0.000	0.222	0.027
attempt	peace	0.425	0.100	0.278	0.471	0.041	0.000	0.071	0.040	0.069	0.277	0.067
consumer	confidence	0.413	0.077	0.196	0.250	0.000	0.000	0.057	0.020	0.000	0.068	0.000
start	year	0.406	0.167	0.439	0.667	0.217	0.125	0.109	0.280	0.372	0.444	0.034
focus	life	0.406	0.167	0.439	0.632	0.248	0.125	0.087	0.160	0.351	0.409	0.062
development	issue	0.397	0.250	0.567	0.800	0.316	0.250	0.209	0.560	0.620	0.438	0.072
day	summer	0.394	0.250	0.567	0.824	0.281	0.250	0.127	0.140	0.471	0.236	0.050
theater	history	0.391	0.143	0.391	0.625	0.112	0.000	0.077	0.060	0.179	0.205	0.025
situation	isolation	0.388	0.250	0.567	0.800	0.248	0.250	0.108	0.400	0.402	0.240	0.141
profit	warning	0.388	0.125	0.253	0.444	0.041	0.000	0.064	0.100	0.061	0.182	0.039
media	trading	0.388	0.143	0.391	0.700	0.165	0.000	0.063	0.140	0.206	0.160	0.011
chance	credibility	0.388	0.167	0.439	0.625	0.191	0.125	0.084	0.060	0.288	0.265	0.015
precedent	information	0.385	0.333	0.657	0.875	0.408	0.375	0.170	0.580	0.631	0.593	0.028
architecture	century	0.378	0.100	0.278	0.471	0.041	0.000	0.054	0.020	0.052	0.110	0.010
population	development	0.375	0.143	0.391	0.769	0.443	0.000	0.069	0.140	0.066	0.235	0.052
peace	atmosphere	0.369	0.200	0.497	0.778	0.357	0.188	0.086	0.080	0.433	0.193	0.055
morality	marriage	0.369	0.167	0.439	0.667	0.191	0.125	0.088	0.140	0.295	0.206	0.013

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Table 1 –Continued from previous page

Word 1	Word 2	Human	path	lch	wup	res	hso	jcn	lesk	lin	vec	vecp
minority	peace	0.369	0.167	0.439	0.706	0.248	0.125	0.059	0.040	0.220	0.102	0.034
cup	object	0.369	0.200	0.439	0.615	0.222	0.188	0.150	0.500	0.301	0.189	0.036
atmosphere	landscape	0.369	0.111	0.312	0.556	0.251	0.000	0.078	0.040	0.328	0.121	0.034
report	gain	0.363	0.250	0.471	0.533	0.041	0.000	0.080	0.200	0.076	0.309	0.241
music	project	0.363	0.250	0.567	0.842	0.230	0.250	0.101	0.180	0.368	0.512	0.030
seven	series	0.356	0.111	0.312	0.500	0.041	0.000	0.064	0.180	0.062	0.116	0.008
experience	music	0.347	0.167	0.439	0.706	0.220	0.125	0.093	0.140	0.339	0.337	0.049
school	center	0.344	0.333	0.657	0.889	0.408	0.313	0.127	1.000	0.566	0.377	0.058
five	month	0.338	0.125	0.349	0.588	0.217	0.000	0.090	0.060	0.328	0.068	0.039
announcement	production	0.338	0.143	0.391	0.625	0.222	0.000	0.088	0.180	0.327	0.177	0.032
morality	importance	0.331	0.200	0.497	0.750	0.331	0.188	0.151	0.040	0.555	0.163	0.013
money	operation	0.331	0.111	0.312	0.500	0.041	0.000	0.096	0.200	0.090	0.175	0.067
delay	news	0.331	0.125	0.349	0.632	0.137	0.000	0.068	0.140	0.188	0.278	0.077
governor	interview	0.325	0.067	0.151	0.222	0.000	0.000	0.048	0.000	0.000	0.058	0.010
practice	institution	0.319	0.333	0.657	0.875	0.665	0.375	0.239	0.380	0.799	0.266	0.045
century	nation	0.316	0.125	0.349	0.533	0.041	0.000	0.080	0.000	0.076	0.108	0.000
coast	forest	0.315	0.167	0.439	0.615	0.115	0.125	0.058	0.180	0.142	0.165	0.033
shore	woodland	0.308	0.200	0.497	0.667	0.115	0.188	0.060	0.080	0.147	0.107	0.012
drink	car	0.304	0.091	0.248	0.375	0.073	0.000	0.096	0.600	0.148	0.186	0.482
president	medal	0.300	0.071	0.173	0.381	0.041	0.000	0.049	1.000	0.045	0.194	0.017
prejudice	recognition	0.300	0.167	0.439	0.737	0.532	0.125	0.075	0.080	0.292	0.357	0.023
peace	insurance	0.294	0.250	0.567	0.857	0.699	0.250	0.053	0.100	0.052	0.451	0.027
Mars	water	0.294	0.200	0.400	0.556	0.248	0.188	0.078	0.420	0.326	0.210	0.034
cup	artifact	0.292	0.250	0.567	0.800	0.198	0.313	0.177	0.580	0.467	0.181	0.008
media	gain	0.288	0.143	0.391	0.625	0.191	0.000	0.070	0.060	0.067	0.185	0.041
precedent	cognition	0.281	0.250	0.567	0.800	0.220	0.313	0.123	0.060	0.403	0.189	0.022

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Table 1 –Continued from previous page

Word 1	Word 2	Human	path	lch	wup	res	hso	jcn	lesk	lin	vec	vecp
announcement	effort	0.275	0.100	0.278	0.471	0.041	0.000	0.074	0.120	0.071	0.229	0.040
line	insurance	0.269	0.200	0.497	0.778	0.361	0.188	0.117	0.280	0.491	0.223	0.037
crane	implement	0.269	0.200	0.497	0.778	0.292	0.188	0.075	0.120	0.317	0.159	0.009
drink	mother	0.265	0.200	0.439	0.615	0.270	0.125	0.083	0.200	0.131	0.344	0.035
opera	industry	0.263	0.091	0.248	0.444	0.041	0.000	0.066	0.080	0.063	0.149	0.007
volunteer	motto	0.256	0.077	0.196	0.250	0.000	0.000	0.045	0.000	0.000	0.082	0.014
listing	proximity	0.256	0.077	0.196	0.435	0.112	0.000	0.072	0.160	0.051	0.236	0.012
precedent	collection	0.250	0.333	0.657	0.857	0.408	0.375	0.149	0.340	0.603	0.319	0.040
cup	article	0.240	0.200	0.497	0.778	0.618	0.250	1.000	0.340	0.976	0.103	0.022
sign	recess	0.238	0.333	0.561	0.750	0.362	0.313	0.071	0.540	0.252	0.908	0.027
problem	airport	0.238	0.067	0.151	0.222	0.000	0.000	0.056	0.060	0.000	0.125	0.043
direction	combination	0.225	0.143	0.391	0.727	0.230	0.000	0.077	0.180	0.242	0.189	0.026
Wednesday	news	0.222	0.083	0.221	0.421	0.041	0.000	0.064	0.000	0.062	0.065	0.007
cup	entity	0.215	0.143	0.391	0.400	0.000	0.000	0.000	0.100	0.000	0.076	0.009
glass	magician	0.208	0.125	0.349	0.533	0.191	0.000	0.056	0.060	0.139	0.066	0.008
cemetery	woodland	0.208	0.111	0.312	0.500	0.115	0.000	0.054	0.120	0.135	0.062	0.000
possibility	girl	0.194	0.083	0.221	0.267	0.000	0.000	0.070	0.140	0.000	0.165	0.042
cup	substance	0.192	0.143	0.391	0.625	0.270	0.000	0.135	0.660	0.444	0.176	0.018
forest	graveyard	0.185	0.111	0.312	0.500	0.115	0.000	0.054	0.120	0.135	0.090	0.028
stock	egg	0.181	0.167	0.391	0.625	0.425	0.125	0.127	0.300	0.574	0.282	0.047
month	hotel	0.181	0.077	0.196	0.250	0.000	0.000	0.065	0.060	0.000	0.074	0.007
energy	secretary	0.181	0.091	0.248	0.375	0.073	0.000	0.074	0.280	0.119	0.276	0.032
precedent	group	0.177	0.250	0.567	0.769	0.190	0.313	0.106	0.080	0.335	0.249	0.028
production	hike	0.175	0.125	0.349	0.667	0.165	0.000	0.069	0.100	0.220	0.231	0.047
stock	phone	0.162	0.143	0.391	0.727	0.367	0.125	0.119	0.300	0.435	0.684	0.035
holy	sex	0.162	0.100	0.278	0.400	0.073	0.000	0.000	0.100	0.000	0.097	0.014

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Table 1 –Continued from previous page

Word 1	Word 2	Human	path	lch	wup	res	hso	jcn	lesk	lin	vec	vecp
drink	ear	0.131	0.125	0.349	0.533	0.317	0.000	0.075	0.120	0.135	0.101	0.020
delay	racism	0.119	0.143	0.391	0.700	0.165	0.000	0.060	0.020	0.144	0.125	0.039
stock	jaguar	0.092	0.167	0.439	0.815	0.494	0.125	0.121	0.040	0.600	0.116	0.035
stock	life	0.092	0.143	0.391	0.632	0.248	0.125	0.104	0.160	0.375	0.368	0.102
monk	slave	0.092	0.200	0.497	0.714	0.193	0.188	0.064	0.240	0.237	0.251	0.016
lad	wizard	0.092	0.200	0.497	0.714	0.193	0.188	0.073	0.040	0.261	0.052	0.024
sugar	approach	0.088	0.143	0.295	0.476	0.222	0.000	0.067	0.040	0.240	0.088	0.013
rooster	voyage	0.062	0.042	0.003	0.148	0.000	0.000	0.047	0.020	0.000	0.041	0.002
noon	string	0.054	0.083	0.221	0.421	0.041	0.000	0.058	0.040	0.057	0.094	0.000
chord	smile	0.054	0.125	0.253	0.500	0.222	0.000	0.068	0.020	0.274	0.076	0.024
professor	cucumber	0.031	0.077	0.196	0.500	0.187	0.000	0.000	0.000	0.000	0.028	0.003
king	cabbage	0.023	0.100	0.278	0.571	0.270	0.000	0.050	0.120	0.083	0.525	0.024