Conceptual Relations Predict Colexification across Languages (Supplementary Material)

Yang Xu[1*†], Khang Duong[2*], Barbara C. Malt[3], Serena Jiang[4], Mahesh Srinivasan[5]
[1]Department of Computer Science, Cognitive Science Program, University of Toronto
[2]Computational Science Program, Minerva Schools at KGI
[3]Department of Psychology, Lehigh University
[4]Computer Science Program, University of California, Berkeley
[5]Department of Psychology, University of California, Berkeley
These authors contributed equally to this work.
[†]Correspondence: yangxu@cs.toronto.edu

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1 Additional information on the cross-linguistic data

We obtained word lists of 329 languages from the Intercontinental Dictionary Series (IDS; accessed February, 2017) (Lars, Comrie, & Saxena, 2013). Each word list consists of word forms in a given language for a fixed set of 1310 concepts. If a word form does not exist for a concept in a given language, its entry is blank in the dataset. The concepts cover 22 semantic domains such as physical world, kinship, animals, and the body (`http://ids.clld.org`). They are identified by one (e.g., *world*) or a few (e.g., *earth, land*) English words and explicated in more detail in linked entries (e.g., for world, The Earth with all its inhabitants and all the things upon it). The word forms that encode these concepts in other languages were compiled by experts in each of those languages. Other similar databases such as the World Loanword Database (WOLD) (`http://wold.clld.org`) and Logos Dictionary (`http://www.logosdictionary.org`) cover substantially fewer languages (e.g., 41 in WOLD and 60 in Logos), so we chose to focus on the IDS data.

Some of the languages have identical 3-letter ISO language codes in the IDS, so we worked with the set of 246 languages that have uniquely identifiable ISO codes according to Glottolog (`http://glottolog.org`). These languages fall under 41 different language families and 5 geographical regions (or macro-areas), specified by the IDS web resource. We also identified 5 climate categories for these languages based on their geographical distribution, according to the standards of Kppen-Geiger Climate Classification (`http://koeppen-geiger.vu-wien.ac.at`). Table S1 summarizes this information for all languages that we considered.

2 Construction and robustness of colexification frequencies

For each language, we searched for all cases of colexification, where two concepts share the same word form. Where a concept is labeled by more than one word form (e.g., synonyms), we considered colexification to be present whenever one of these forms was shared by another concept in the database. Because all the meanings in the IDS were annotated in English, we do not translate these into any other languages for our analyses. We discarded missing terms for the analyses.

The frequency of colexification across languages for each possible concept pair was determined as follows. We created three colexification distributions controlling separately for the factors of language family, climate, and geographical region. We controlled for language family because languages within the same family might have similar patterns of colexification due to historical relatedness rather than being independent cases of colexification. We controlled for climate and geographical region because languages with similar climate or from the same geographical region might be inclined to share colexification patterns due to shared experiences in the world. In addition, by controlling for these factors we can simulate the variabilities in the data and evaluate more thoroughly the robustness in the estimation of colexification frequencies and our subsequent analyses.

For each of the three factors, we used stratified bootstrapping (Bickel & Freedman, 1984) to generate estimates of frequencies for the colexified meaning pairs. For example, when controlling for language family, we first sample languages with replacement from each individual family; we then collect the family-wise set of colexified pairs of meaning and their respective frequencies by counting on average how many sampled languages (within a family) show those colexification

patterns. This procedure is similar to standard bootstrapping. We then pool these family-wise data and obtain an aggregated estimate of the colexification frequencies across all language families. This procedure generates a stratified bootstrap sample. We followed this procedure 1,000 times for each of the three factors separately. For all of our analyses, we removed data from English, because the predictor variables and models we used to account for colexification were based on data from English speakers.

To assess the robustness of estimated colexification frequencies, we examined the correlation of colexification frequencies across pairs of concepts based on the estimates controlling for the three factors. For each pair of these three factors, we obtained reliably high Spearman's rank order correlations for the estimated mean colexification frequencies (based on all available concept pairs): $\rho = 0.938$ between family-controlled and climate-controlled cases, $\rho = 0.939$ between family-controlled and geography-controlled cases, and $\rho = 0.990$ between climate-controlled and geography-controlled cases ($p < 0.0001$ for all cases). These results suggest that our procedures for frequency estimation are relatively robust to variation in external factors that could have influenced colexification across languages. This observation also confirms Youn et al.'s (2016) basic finding that shared patterns of colexification exist across languages and extends it to a broader scope of concepts and languages.

3 Measures of conceptual association

We used two sources of association data. The primary data source we used is the Human Brain Cloud (HBC) (`http://www.humanbraincloud.com/`), which is a crowd-sourced multi-player online gaming platform. Given a randomly generated word, a user types in the first word that comes to mind. Initially based off a single seeding word *volcano*, all subsequent words and their associates were generated by the online users. The appeal of this database is that it is free-form (not collected under laboratory conditions) and massive in size (approximately 4 million word-associate entries), providing coverage of 1191 of the 1310 concepts we analyzed in the IDS database. In addition, we also used a laboratory-collected, secondary data source from the University of South Florida (USF) (Nelson, McEvoy, & Schreiber, 1998) (`http://w3.usf.edu/FreeAssociation/`), which is a standard database for word association in psychology that is smaller than the HBC set, covering 1026 of the 1310 concepts in the IDS database. For each of a fixed set of 5016 cue words in this experiment, participants responded with the first word that came to mind.

We used simple string matching to match words from the word association databases to concepts in the IDS list. Concretely, for N concepts, we constructed an N-by-N matrix of association $\mathbf{A}$, where each (i, j) entry records the probability that concept j is an associate of concept i (based on the HBC and USF datasets separately). We obtained the probability $p(i \geq j)$ by dividing the associative strength from i to j into the associative strengths from i to all available concepts, and vice versa for $p(j \geq i)$. Some concepts in the IDS involve multiple-word definitions, e.g., "earth, land", so we collapsed these cases by taking the maximum associative probability among the words in such definitions. For all measures that we describe below, we use the same operation to treat multiple-word or synonymous definitions. Some meanings in the IDS are specified in phrases as opposed to words (see Table S2 for the list of senses), and we excluded these for our analyses. Note that by using word association data to estimate association of concepts, we are making the simplifying assumption that the meaning a person has in mind when generating a word in the association

task matches the concept in the IDS. Given the phenomenon of colexification, this assumption is unlikely to be correct in all cases. This assumption limits the scope of our analysis but also adds some noise to the data, working against our hypothesis.

We formulated the association model of colexification by considering the expected associativity between concepts obtained from these word associations. In particular, for a given pair of concepts (i, j), we took the average of forward (e.g., $i \geq j$) and backward (e.g., $j \geq i$) associative probabilities as the expected associativity.

4 Examples of colexification, conceptual associativity and similarity

We provide example pairs of concepts from the colexification data, as well as those based on the measures of conceptual associativity and similarity.

Table S3 shows the 100 most frequently colexified pairs of concepts, controlling for the factors of language family, climate, and geography. Out of these 100 pairs, we calculated the percentage of pairs that was also present in the HBC association data. Namely, we looked at the coverage rate of top colexified concept pairs that received non-zero conceptual associative strength. We observed that these concept pairs are broadly accounted for by association, and this trend is consistent across the three factors: coverage 92% (family-controlled), 96% (climate-controlled), and 92% (geography-controlled). Because the conceptual similarity measure based on word2vec is continuous and positive, it is not meaningful for us to report the coverage percentage in this case (i.e., it is 100% by default).

Table S4 shows the 100 most strongly associated concepts from the HBC association data, and the extent to which these concepts are colexified across languages. Out of these 100 pairs, we calculated the percentage overlap between concepts that are associated and concepts that are colexified (in at least one language). We observed that the percentage overlap is consistent but not near-ceiling in these cases: 47% (family-controlled), 48% (climate-controlled), and 48% (geography-controlled). In particular, the associativity measure tends to predict antonym conceptual relations such as "west" and "east", and "good" and "bad", which are not typically colexified in any language in our set. This observation suggests that the association measure has its limitations (as we would expect) and is not perfect in predicting the colexification patterns.

Table S5 shows the 100 most similar concepts from the pre-trained word2vec word embeddings, and the extent to which these concepts are represented in colexification patterns across languages. Similar to the measure of association, we also observed the percentage overlap is consistent but not near-ceiling in these cases: 46% (family-controlled), 51% (climate-controlled), and 51% (geography-controlled). However, we also observed that many concepts that are considered highly similar under the word2vec measure tend to be numerals such as "three" and "six", because this measure reflects only similarity based on linguistic usage (or context). Because the similarity measure is finer grained and continuous (whereas the association measure tends to be very sparse, since people do not associate each pair of concepts), it tends to have a better coverage (or standard recall accuracy) of the colexification data than the associativity measure.

5 Construction of higher-order associations

We formulated models of higher-order (or indirect) associations by considering multiple associative paths between concepts, adapted from work by De Deyne and Storms (2008). A second order association between concepts (i, j) exists if there is some intermediate concept k that establishes a possible connected path among the three nodes. Following De Deyne and Storms (2008), three unique paths exist depending on the directions of association: 1) $i \geq k \geq j$ (or equivalently, $j \geq k \geq i$); 2) $i \geq k, j \geq k$; 3) $k \geq j, k \geq i$. Because we wished to assess the possibility that (i, j) can be indirectly associated in the second order, we considered all possible k's that could have led to a connected path by integration. Thus, for path 1) described, the probability of (i, j) being associable from any intermediate concept k is simply $\sum_k p(k|i)p(j|k)$, where the products draw on the corresponding associative probabilities from the $\mathbf{A}$ matrix constructed from word association, as described earlier. Mathematically, it can be shown that this integration step results in a transition matrix A2 that specifies the probability of second-order association given any (i, j) pair of concepts, following path 1). Similarly, $\mathbf{A}\mathbf{A}^T$ and $\mathbf{A}^T\mathbf{A}$ specify the probability of second-order association given any (i, j) pair for paths 2) and 3). For third-order associations, we considered four possible paths that are captured by matrices $\mathbf{A}^3$ (i.e., $i \geq k \geq l \geq j$), $\mathbf{A}^2\mathbf{A}^T$ (i.e., $i \geq k \geq l$, $j \geq l$), $\mathbf{A}\mathbf{A}^T\mathbf{A}$ (i.e., $i \geq k$, $l \geq k$, $l \geq j$), and $\mathbf{A}^T\mathbf{A}^2$ (i.e., $k \geq i$, $k \geq l$, $l \geq j$).

To determine if an indirect association might exist between a pair of concepts (and if so at what order), we went through the transition matrices in an ascending order. If the (i, j) element in the original association matrix $\mathbf{A}$ is non-zero, then we identified that pair as directly associable (i.e., order 1). If the (i, j) element in $\mathbf{A}$ is zero, we then checked the corresponding elements in the three transition matrices of the second orderif it is non-zero in any of these matrices, then a possible associative path exists in order 2. We repeated this procedure for order 3 if we failed to find any path in the second order.

6 Results from secondary association data

Figure S1 shows mean frequencies of colexification of pairs of meaning that fall under first, second, and third order associates based on the USF word association data. The procedures for obtaining these results are identical to those for the Human Brain Cloud dataset, which we report along with statistical significance in the main text.

7 Results under Monte Carlo simulation

In addition to the stratified bootstrapping procedure reported in the main text, we also constructed colexification matrices with the alternative procedure using Monte Carlo simulation (Everett, Blasi, & Roberts, 2015). Such a procedure allows only a single language to be sampled from each of the 41 language families, so that families over-represented in the IDS database (such as Indo-European family) would be treated equally in sample size as those families with fewer languages. Similar to the case of stratified bootstrapping, we generated 1000 rounds of Monte Carlo sampled colexification matrices for analyses of all the language families. Each round produces a colexification matrix that aggregates 41 data points from 41 families (i.e., exactly 1 data point per family).

Figures S2–S5 show that the results with Monte Carlo simulation are consistent with the results under the stratified bootstrapping reported in Figures 2–4 in the main text. We considered the family-controlled cases here because there exists uneven sampling among the language families, with Indo-European family being the most represented of all 41 families that we worked with. This set of results shows that our main findings are robust under the two different sampling schemes, stratified bootstrapping and Monte Carlo, for constructing cross-linguistic colexification.

8 Results with exclusion of superordination and co-hyponyms

A small percentage of the IDS meanings bear superordite relations with one another. For instance, "parents" is the superordinate concept of "mother". We used the Natural Language Toolkit (NLTK) Python WordNet (Miller, 1995; Fellbaum, 1998) interface (`http://www.nltk.org/_modules/nltk/corpus/reader/wordnet.html`) to automatically identify concepts that bear identifiable superordinate-subordinate relations based on hypernym synsets for all pairs of IDS senses that we worked with. Table S6 shows the exhaustive set of 142 concept pairs that bear superordinate-subordinate relations from the IDS senses, including a subset of 61 pairs that have been attested as colexified in at least two languages.

To examine how these superordinate relations might affect our results on colexification, we repeated the analyses reported in the main text by removing the pairs of superordinate-subordinate concepts that we have extracted. We found that our results are consistent with those reported in the main text with the exclusion of these meaning pairs. Figures S6–S9 illustrate these results that mirror those reported in Figures 2–4 in the main text.

Although the analysis just described treats IDS meaning pairs that fall under direct superordinate relations, it does not rule out the possibility that there exist IDS meaning pairs that are co-hyponyms of each other and yet their shared superordinate terms are not present in the IDS. For instance, concepts "husband" and "wife" can be considered as co-hyponyms since they share the superordinate concept "spouse", and though both concepts are themselves in the IDS meanings, "spouse" is not. To account for pairs of co-hyponym meanings where the superordinate terms might be under-represented (or hidden) in the IDS, we used the NLTK WordNet interface to extract all such cases where the shared superordinate concepts can be identified according to the conceptual taxonomy defined in WordNet. As such, even if "spouse" is not represented in the IDS, we can still identify "husband" and "wife" as co-hyponyms and hence potential candidates for superordination (under the hidden superordinate term "spouse"). Table S7 shows the exhaustive set of 764 concept pairs that bear co-hyponym relations from the IDS senses (along with their superordinate concepts identified in WordNet), including a subset of 221 pairs that have been attested as colexified in at least two languages.

To examine how jointly the co-hyponym and superordinate relations might affect our results on colexification, we repeated the analyses reported in the main text by removing both the pairs of superordinate-subordinate and co-hyponym concepts that we have extracted. We found that our results are still robust and consistent with those reported in the main text with the exclusion of these meaning pairs. Figures S10–S13 illustrate these results that mirror those reported in Figures 2–4 in the main text.

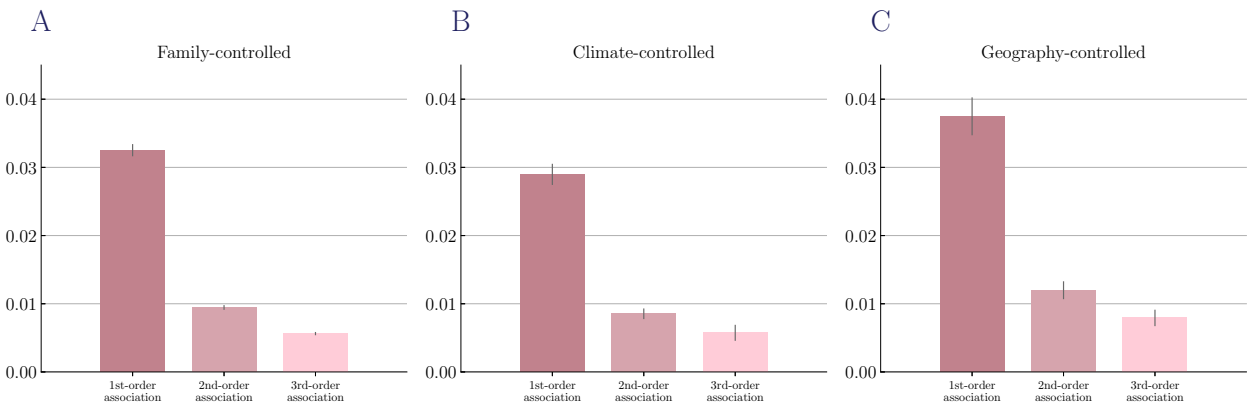

Figure S1: Gradient of colexification frequencies in ordered association sets. Results are based on the USF association data, controlled for language family, climate category, and geographical region. Error bars indicate 95% confidence intervals from bootstrapping.

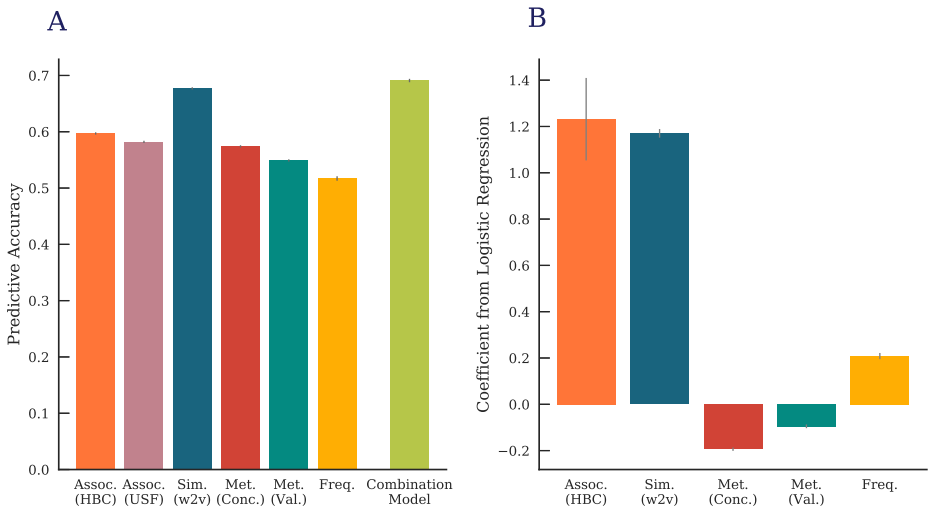

Figure S2: Results from predictive analyses of cross-linguistic colexification based on Monte Carlo simulation. A) Cross-validated predictive accuracies in classifying colexified versus non-colexified sense pairs from individual variables and variables in combination, using logistic regression. B) Logistic regression coefficients of different variables from the combination model. Abbreviations are used for the following variables: "Assoc"→"Associativity", "Sim"→"Similarity", "Met. (Conc.)"→"Metaphoricity (Concreteness)", "Met. (Val.)"→"Metaphoricity (Valence)", "Freq."→"Frequency". Error bars indicate deviations in predictive accuracy from the randomized cross validation sets.

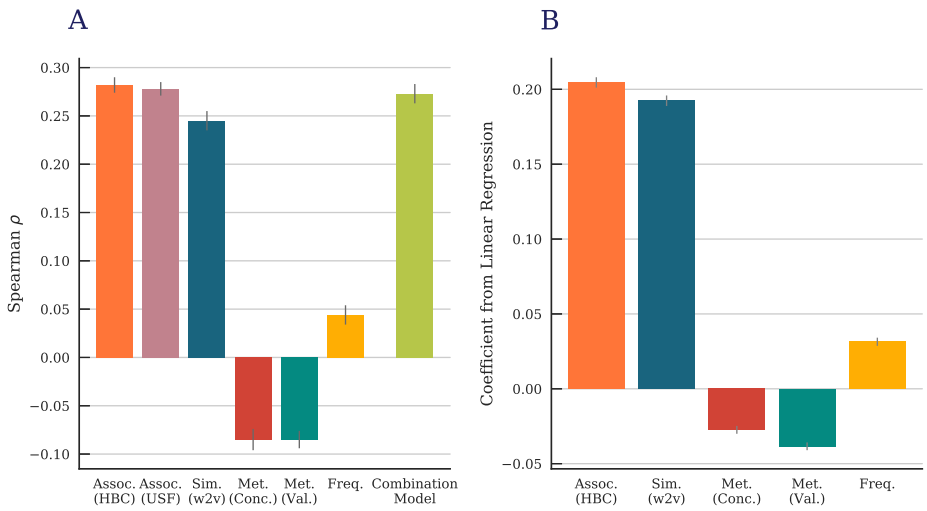

Figure S3: Results of variable correlations with colexification frequencies across languages estimated from Monte Carlo simulation. Panel A) shows results from correlations with individual variables and linear regression from variables in combination. Panel B) shows coefficients of individual variables from the linear regression. Colexification frequencies are calculated by controlling for language family. Abbreviations are used for the following variables: "Assoc"→"Associativity", "Sim"→"Similarity", "Met. (Conc.)"→"Metaphoricity (Concreteness)", "Met. (Val.)"→"Metaphoricity (Valence)", "Freq."→"Frequency". Error bars indicate 95% confidence intervals from the Monte Carlo samples.

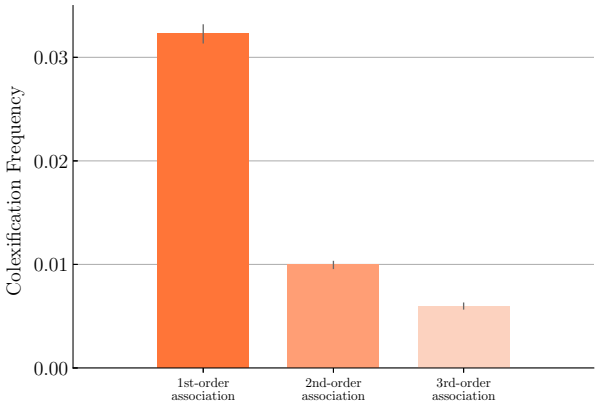

Figure S4: Gradient of colexification frequencies from Monte Carlo simulation in ordered association sets. Results are based on the HBC association data, controlled for language family. Error bars indicate 95% confidence intervals from the Monte Carlo samples.

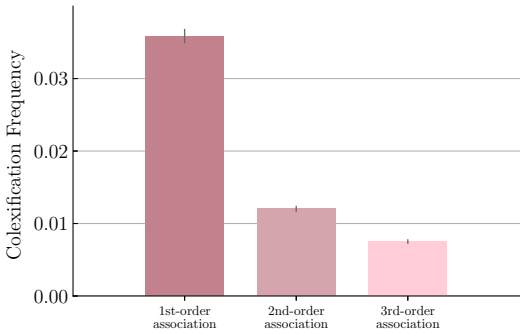

Figure S5: Gradient of colexification frequencies from Monte Carlo simulation in ordered association sets. Results are based on the USF association data, controlled for language family. Error bars indicate 95% confidence intervals from the Monte Carlo samples.

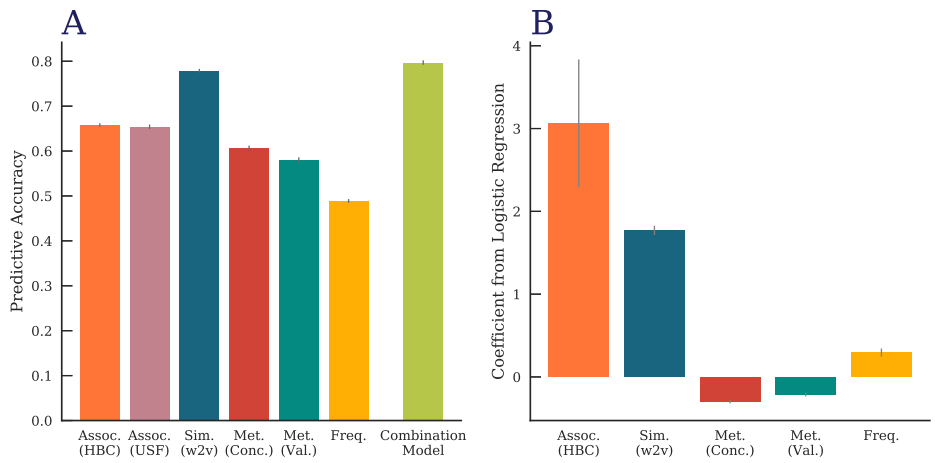

Figure S6: Results from predictive analyses of cross-linguistic colexification with superordinate-subordinate pairs excluded. A) Cross-validated predictive accuracies in classifying colexified versus non-colexified sense pairs from individual variables and variables in combination, using logistic regression. B) Logistic regression coefficients of different variables from the combination model. Abbreviations are used for the following variables: "Assoc"→"Associativity", "Sim"→"Similarity", "Met. (Conc.)"→"Metaphoricity (Concreteness)", "Met. (Val.)"→"Metaphoricity (Valence)", "Freq."→"Frequency". Error bars indicate deviations in predictive accuracy from the randomized cross validation sets.

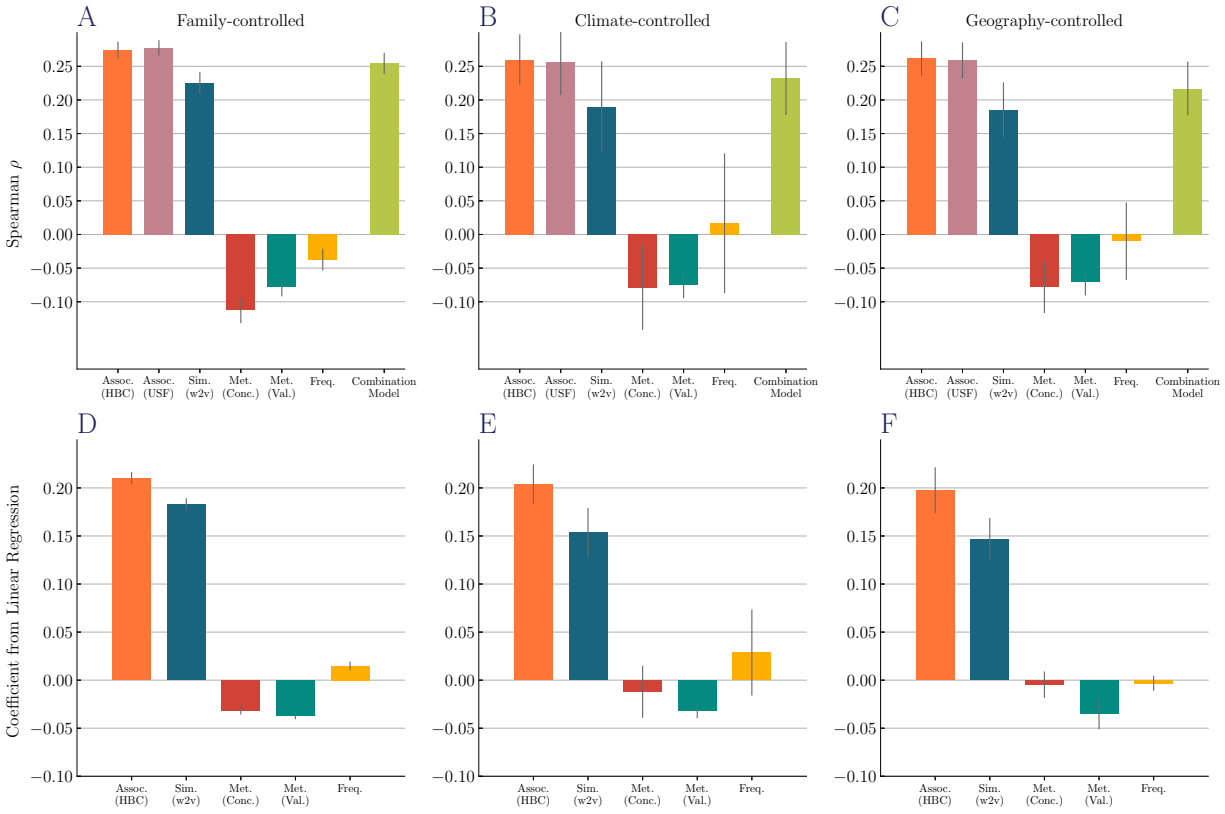

Figure S7: Results of variable correlations with colexification frequencies across languages with superordinate-subordinate pairs excluded. Panel A) shows results from correlations with individual variables and linear regression from variables in combination. Panel B) shows coefficients of individual variables from the linear regression. Colexification frequencies are calculated by controlling for language family, climate category, and geographical region. Abbreviations are used for the following variables: "Assoc"→"Associativity", "Sim"→"Similarity", "Met. (Conc.)"→"Metaphoricity (Concreteness)", "Met. (Val.)"→"Metaphoricity (Valence)", "Freq."→"Frequency". Error bars indicate 95% confidence intervals from bootstrapping.

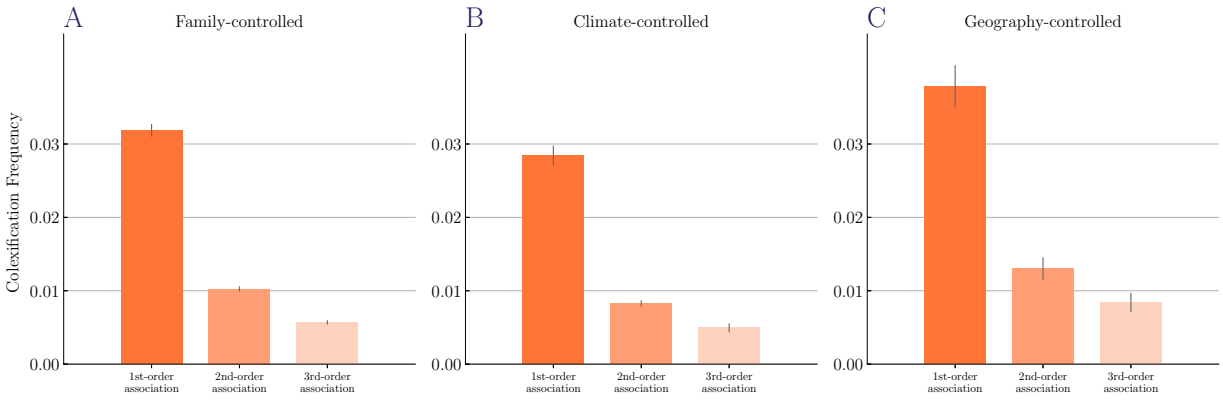

Figure S8: Gradient of colexification frequencies in ordered association sets with superordinate-subordinate pairs excluded. Results shown are based on the HBC association data, controlled for language family, climate category, and geographical region. Error bars indicate 95% confidence intervals from bootstrapping.

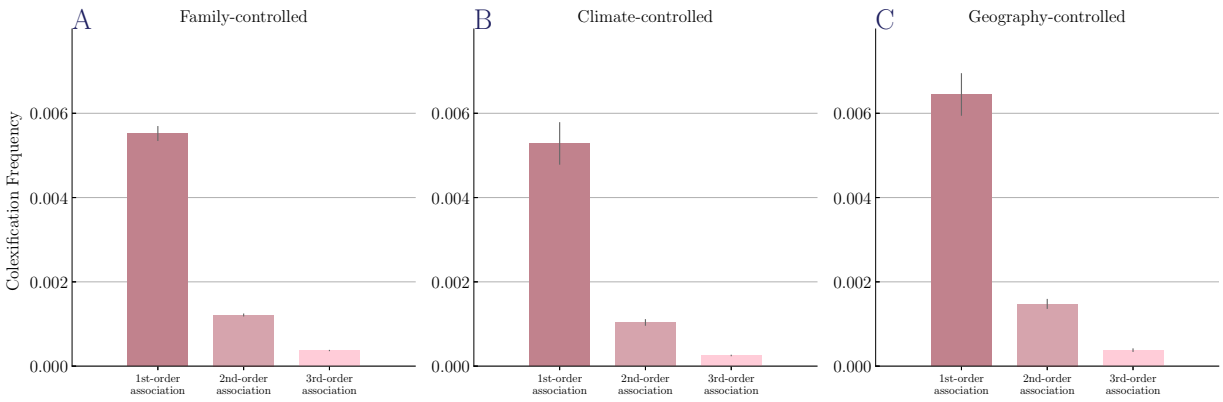

Figure S9: Gradient of colexification frequencies in ordered association sets with superordinate-subordinate pairs excluded. Results shown are based on the USF association data, controlled for language family, climate category, and geographical region. Error bars indicate 95% confidence intervals from bootstrapping.

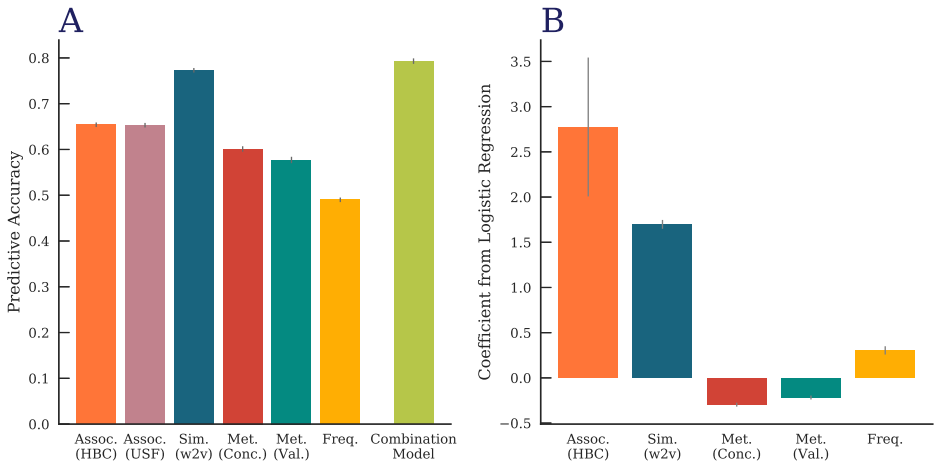

Figure S10: Results from predictive analyses of cross-linguistic colexification with superordinate-subordinate and co-hyponym pairs excluded. A) Cross-validated predictive accuracies in classifying colexified versus non-colexified sense pairs from individual variables and variables in combination, using logistic regression. B) Logistic regression coefficients of different variables from the combination model. Abbreviations are used for the following variables: "Assoc"→"Associativity", "Sim"→"Similarity", "Met. (Conc.)"→"Metaphoricity (Concreteness)", "Met. (Val.)"→"Metaphoricity (Valence)", "Freq."→"Frequency". Error bars indicate deviations in predictive accuracy from the randomized cross validation sets.

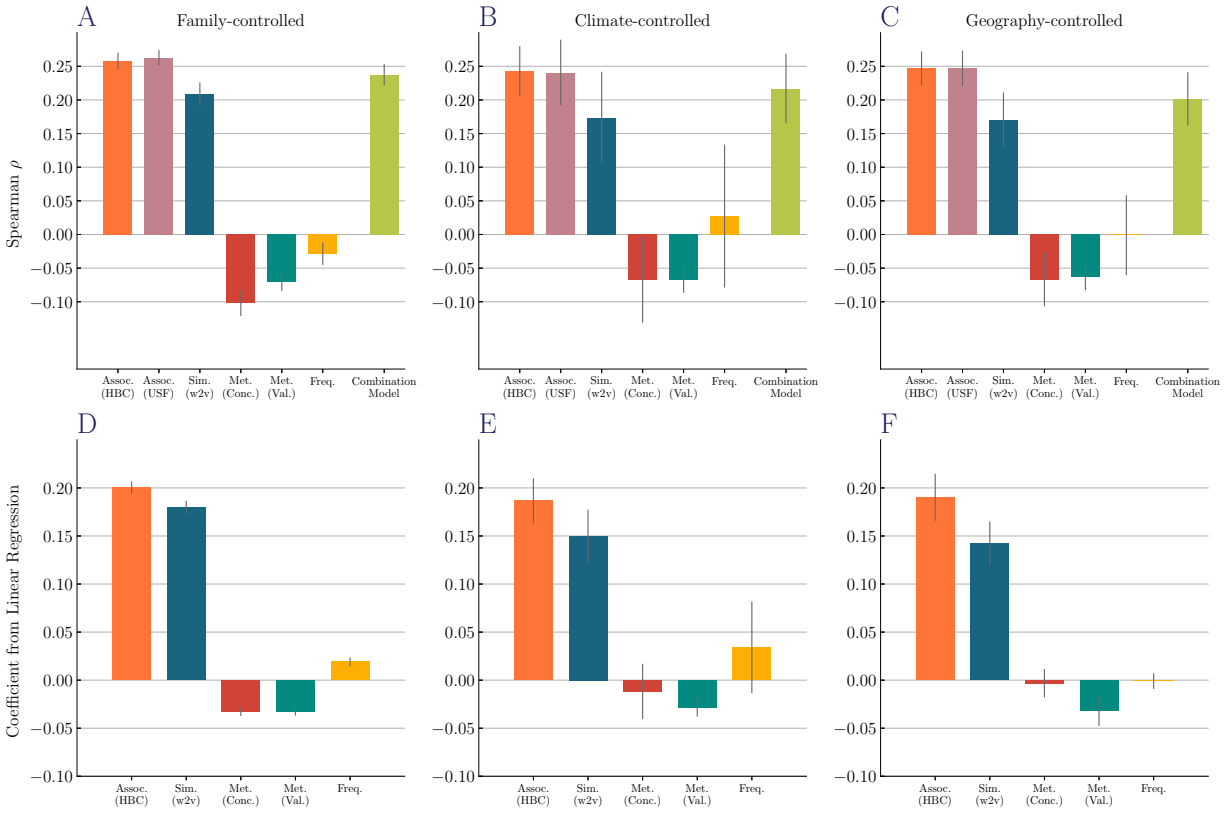

Figure S11: Results of variable correlations with colexification frequencies across languages with superordinate-subordinate and co-hyponym pairs excluded. Panel A) shows results from correlations with individual variables and linear regression from variables in combination. Panel B) shows coefficients of individual variables from the linear regression. Colexification frequencies are calculated by controlling for language family, climate category, and geographical region. Abbreviations are used for the following variables: "Assoc"→"Associativity", "Sim"→"Similarity", "Met. (Conc.)"→"Metaphoricity (Concreteness)", "Met. (Val.)"→"Metaphoricity (Valence)", "Freq."→"Frequency". Error bars indicate 95% confidence intervals from bootstrapping.

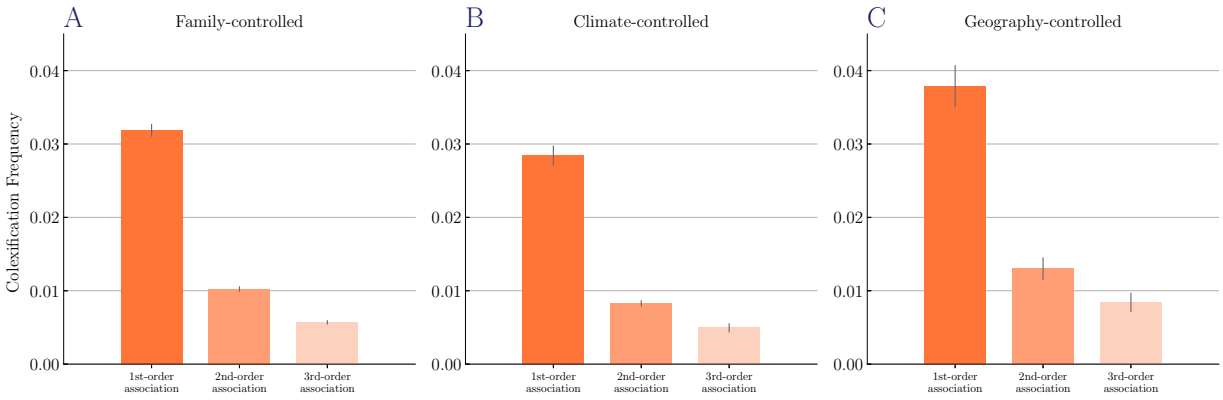

Figure S12: Gradient of colexification frequencies in ordered association sets with superordinate-subordinate and co-hyponym pairs excluded. Results shown are based on the HBC association data, controlled for language family, climate category, and geographical region. Error bars indicate 95% confidence intervals from bootstrapping.

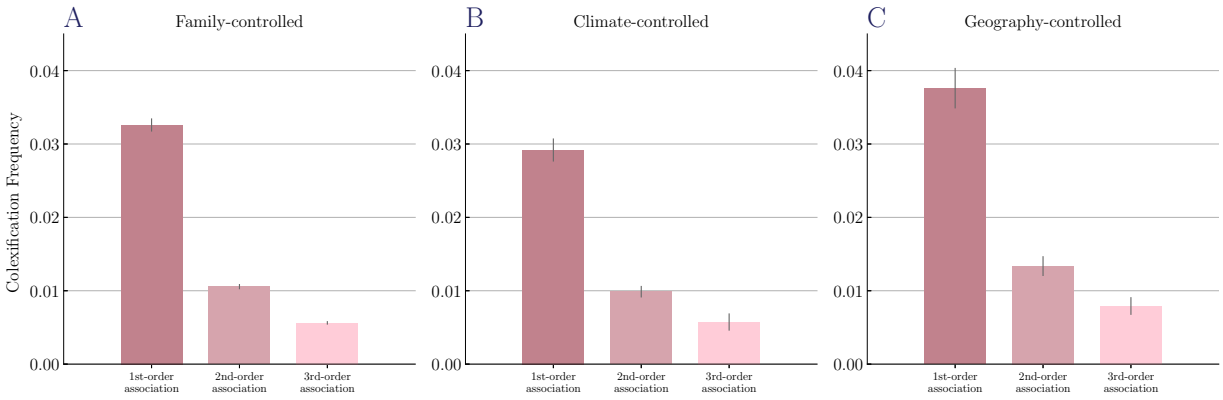

Figure S13: Gradient of colexification frequencies in ordered association sets with superordinate-subordinate and co-hyponym pairs excluded. Results shown are based on the USF association data, controlled for language family, climate category, and geographical region. Error bars indicate 95% confidence intervals from bootstrapping.

Table S1: Languages studied and related information.

Language	Family	Climate	Geography
Ach	Tupian	Warm temperate	South America
Aghul	Nakh-Daghestanian	Snow	Eurasia
Aguaruna	Jivaroan	Equatorial	South America
Ahlao Th	Austroasiatic	Equatorial	Eurasia
Akhvakh (Northern Akhvakh)	Nakh-Daghestanian	Snow	Eurasia
Akhvakh (Southern Akhvakh)	Nakh-Daghestanian	Snow	Eurasia
Albanian (Tosk variety)	Indo-European	Warm temperate	Eurasia
Ancient Greek	Indo-European	Warm temperate	Eurasia
Andi	Nakh-Daghestanian	Snow	Eurasia
Araona	Pano-Tacanan	Equatorial	South America
Archi (variety 1)	Nakh-Daghestanian	Snow	Eurasia
Archi (variety 2)	Nakh-Daghestanian	Snow	Eurasia
Avar	Nakh-Daghestanian	Snow	Eurasia
Avar (Ansalta dialect)	Nakh-Daghestanian	Snow	Eurasia
Avar (Araderikh dialect)	Nakh-Daghestanian	Snow	Eurasia
Avar (East, Gergebil dialect)	Nakh-Daghestanian	Snow	Eurasia
Avar (Kusur dialect)	Nakh-Daghestanian	Snow	Eurasia
Avestan	Indo-European	Arid	Eurasia
Aymara	Aymara	Warm temperate	South America
Ayoreo	Zamucoan	Equatorial	South America
Azerbaijan (Terekeme dialect)	Turkic	Warm temperate	Eurasia
Azerbaijani	Turkic	Warm temperate	Eurasia
Bagvalal	Nakh-Daghestanian	Snow	Eurasia
Bar	Chibchan	Equatorial	South America
Baure	Arawakan	Equatorial	South America
Bella Coola	Salishan	Snow	North America
Bengali	Indo-European	Equatorial	Eurasia
Bezhta	Nakh-Daghestanian	Snow	Eurasia
Botlikh	Nakh-Daghestanian	Snow	Eurasia
Botlikh (Miarso dialect)	Nakh-Daghestanian	Snow	Eurasia
Breton	Indo-European	Warm temperate	Eurasia

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Budukh	Nakh-Daghestanian	Snow	Eurasia
Bulang	Austroasiatic	Warm temperate	Eurasia
Bulang-2	Austroasiatic	Warm temperate	Eurasia
Bulang-3	Austroasiatic	Warm temperate	Eurasia
Bulgarian	Indo-European	Warm temperate	Eurasia
Canela	Nuclear-Macro-Je	Equatorial	South America
Cashibo	Pano-Tacanan	Equatorial	South America
Catalan	Indo-European	Warm temperate	Eurasia
Catuquina	Pano-Tacanan	Equatorial	South America
Cavinea	Pano-Tacanan	Equatorial	South America
Cayapa	Barbacoan	Equatorial	South America
Central Thai	Tai-Kadai	Equatorial	Eurasia
Chadong	Tai-Kadai	Warm temperate	Eurasia
Chamalal	Nakh-Daghestanian	Snow	Eurasia
Chatino (Zacatepec variety)	Otomanguean	Warm temperate	North America
Chechen	Nakh-Daghestanian	Warm temperate	Eurasia
Chechen (Akkin dialect)	Nakh-Daghestanian	Warm temperate	Eurasia
Chipaya	Uri-Chipaya	Arid	South America
Chiriguano	Tupian	Arid	South America
Chong	Austroasiatic	Equatorial	Eurasia
Chorote	Matacoan	Warm temperate	South America
Chcobo	Pano-Tacanan	Equatorial	South America
Colorado	Barbacoan	Warm temperate	South America
Czech	Indo-European	Warm temperate	Eurasia
Danish	Indo-European	Warm temperate	Eurasia
Dargwa	Nakh-Daghestanian	Snow	Eurasia
Dargwa (Gapshima Shukti dialect)	Nakh-Daghestanian	Snow	Eurasia
Dargwa (Gapshima dialect)	Nakh-Daghestanian	Snow	Eurasia
Dargwa (Gubden dialect)	Nakh-Daghestanian	Snow	Eurasia
Dargwa (Kadar dialect)	Nakh-Daghestanian	Snow	Eurasia
Dargwa (Megeb dialect)	Nakh-Daghestanian	Snow	Eurasia
Dargwa (Mekegi dialect)	Nakh-Daghestanian	Snow	Eurasia
Dargwa (Mugi dialect)	Nakh-Daghestanian	Snow	Eurasia

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Dargwa (Muiri dialect)	Nakh-Daghestanian	Snow	Eurasia
Dargwa (Sirkhi dialect)	Nakh-Daghestanian	Snow	Eurasia
Dargwa (Usisha dialect)	Nakh-Daghestanian	Snow	Eurasia
De'kwana	Cariban	Equatorial	South America
Dehong	Tai-Kadai	Warm temperate	Eurasia
Dutch	Indo-European	Warm temperate	Eurasia
Ecun Buyang	Tai-Kadai	Warm temperate	Eurasia
Embera	Chocoan	Equatorial	South America
Epena	Chocoan	Equatorial	South America
Erzya Mordvin	Uralic	Snow	Eurasia
Ese Ejja	Pano-Tacanan	Equatorial	South America
Ese Ejja (Huarayo)	Pano-Tacanan	Equatorial	South America
Estonian	Uralic	Snow	Eurasia
Finnish	Uralic	Snow	Eurasia
French	Indo-European	Warm temperate	Eurasia
German	Indo-European	Warm temperate	Eurasia
Goajiro	Arawakan	Equatorial	South America
Godoberi	Nakh-Daghestanian	Snow	Eurasia
Gothic	Indo-European	Warm temperate	Eurasia
Guaran	Tupian	Warm temperate	South America
Hausa	Afro-Asiatic	Equatorial	Africa
Hawaiian	Austronesian	Warm temperate	Papunesia
Hindi	Indo-European	Warm temperate	Eurasia
Hinuq	Nakh-Daghestanian	Snow	Eurasia
Hlai (Baoting variety)	Tai-Kadai	Equatorial	Eurasia
Hungarian	Uralic	Warm temperate	Eurasia
Hunzib	Nakh-Daghestanian	Snow	Eurasia
Iduh	Austroasiatic	Warm temperate	Eurasia
Ignaciano	Arawakan	Equatorial	South America
Ingush	Nakh-Daghestanian	Snow	Eurasia
Irish	Indo-European	Warm temperate	Eurasia
Italian	Indo-European	Warm temperate	Eurasia
Jamaican Creole (Limonese Creole dialect)	Indo-European	Equatorial	North America
Jinsha Dai	Hmong-Mien	Warm temperate	Eurasia
Judeo-Tat	Indo-European	Warm temperate	Eurasia
Kaingng	Nuclear-Macro-Je	Warm temperate	South America
Karaj	Nuclear-Macro-Je	Equatorial	South America

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Karata	Nakh-Daghestanian	Snow	Eurasia
Kasong	Austroasiatic	Equatorial	Eurasia
Keme (Kemie variety)	Austroasiatic	Warm temperate	Eurasia
Khamuang (Chiang Mai variety)	Tai-Kadai	Equatorial	Eurasia
Khanty	Uralic	Snow	Eurasia
Khasi	Austroasiatic	Equatorial	Eurasia
Khinalug	Nakh-Daghestanian	Snow	Eurasia
Khwarshi (Kwantlada dialect)	Nakh-Daghestanian	Snow	Eurasia
Kme-2 (Kemie variety)	Austroasiatic	Warm temperate	Eurasia
Komi	Uralic	Snow	Eurasia
Kryz	Nakh-Daghestanian	Snow	Eurasia
Kumyk	Turkic	Snow	Eurasia
Kumyk (Dorgeli dialect)	Turkic	Snow	Eurasia
Kumyk (Kajtak Tumenler dialect)	Turkic	Snow	Eurasia
Kumyk (Kajtak dialect)	Turkic	Snow	Eurasia
Kumyk (Karabudakhkent dialect)	Turkic	Snow	Eurasia
Kumyk (Ter Bragun dialect)	Turkic	Snow	Eurasia
Lak	Nakh-Daghestanian	Snow	Eurasia
Lak (Arakul dialect)	Nakh-Daghestanian	Snow	Eurasia
Lak (Balkhar dialect)	Nakh-Daghestanian	Snow	Eurasia
Lak (Shali dialect)	Nakh-Daghestanian	Snow	Eurasia
Lakkia	Tai-Kadai	Warm temperate	Eurasia
Langja Buyang	Tai-Kadai	Warm temperate	Eurasia
Latin	Indo-European	Warm temperate	Eurasia
Latvian	Indo-European	Snow	Eurasia
Lengua	Lengua-Mascoy	Equatorial	South America
Lezgian	Nakh-Daghestanian	Snow	Eurasia
Lezgian (Mikrakh dialect)	Nakh-Daghestanian	Snow	Eurasia
Lithuanian	Indo-European	Snow	Eurasia
Maca	Matacoan	Equatorial	South America
Macushi	Cariban	Equatorial	South America

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Mahasu Pahari (Kotghari dialect)	Indo-European	Warm temperate	Eurasia
Mang Ch	Austroasiatic	Warm temperate	Eurasia
Mang VN	Austroasiatic	Warm temperate	Eurasia
Mansi	Uralic	Snow	Eurasia
Maonan	Tai-Kadai	Warm temperate	Eurasia
Maori	Austronesian	Warm temperate	Papunesia
Mapudungun	Araucanian	Warm temperate	South America
Marathi	Indo-European	Equatorial	Eurasia
Mari	Uralic	Snow	Eurasia
Marquesan	Austronesian	Warm temperate	Papunesia
Mashco Piro	Arawakan	Equatorial	South America
Mlabri	Austroasiatic	Equatorial	Eurasia
Mocov	Guaicuruan	Warm temperate	South America
Modern Greek	Indo-European	Warm temperate	Eurasia
Muisca	Chibchan	Equatorial	South America
Mulam	Tai-Kadai	Warm temperate	Eurasia
Munduruk	Tupian	Equatorial	South America
Nahuatl (Sierra de Zacapoaxtla variety)	Uto-Aztecan	Equatorial	North America
Negerhollands	Indo-European	Equatorial	North America
Nenets	Uralic	Snow	Eurasia
Ninam (Shirishana variety)	Yanomam	Equatorial	South America
Nivacl	Matacoan	Warm temperate	South America
Nogai	Turkic	Warm temperate	Eurasia
Northern Haida	Haida	Warm temperate	North America
Northern Saami	Uralic	Snow	Eurasia
Nung-Fengshan	Tai-Kadai	Warm temperate	Eurasia
Nung-Lazhai	Tai-Kadai	Warm temperate	Eurasia
Nung-Ninbei	Tai-Kadai	Warm temperate	Eurasia
Nyakur	Austroasiatic	Equatorial	Eurasia
Old Church Slavonic	Indo-European	Warm temperate	Eurasia
Old Prussian	Indo-European	Warm temperate	Eurasia
Ossetic	Indo-European	Snow	Eurasia
Pacaas Novos	Chapacuran	Equatorial	South America
Pacahuara	Pano-Tacanan	Equatorial	South America
Paliu	Austroasiatic	Warm temperate	Eurasia
Panare	Cariban	Equatorial	South America
Pear	Austroasiatic	Equatorial	Eurasia
Persian	Indo-European	Arid	Eurasia
Phong	Austroasiatic	Warm temperate	Eurasia
Pilag	Guaicuruan	Warm temperate	South America

Continued on next page

Polci	Afro-Asiatic	Equatorial	Africa
Polish	Indo-European	Warm temperate	Eurasia
Portuguese	Indo-European	Warm temperate	Eurasia
Prai	Austroasiatic	Warm temperate	Eurasia
Punjabi	Indo-European	Arid	Eurasia
Pusing	Austroasiatic	Warm temperate	Eurasia
Qau Kelao	Tai-Kadai	Warm temperate	Eurasia
Qawasqar	Kawesquar	Polar	South America
Rapa Nui	Austronesian	Warm temperate	Papunesia
Romani	Indo-European	Snow	Eurasia
Romanian	Indo-European	Snow	Eurasia
Rotuman	Austronesian	Warm temperate	Papunesia
Rumai	Austroasiatic	Warm temperate	Eurasia
Russian	Indo-European	Snow	Eurasia
Rutul	Nakh-Daghestanian	Snow	Eurasia
Rutul (Borchino Khnow dialect)	Nakh-Daghestanian	Snow	Eurasia
Samre	Austroasiatic	Equatorial	Eurasia
Sanapan (Enlhet dialect)	Lengua-Mascoy	Equatorial	South America
Sanchong Kelao	Tai-Kadai	Warm temperate	Eurasia
Sanskrit	Indo-European	Equatorial	Eurasia
Selknam	Chonan	Warm temperate	South America
Selkup	Uralic	Snow	Eurasia
Shan	Tai-Kadai	Warm temperate	Eurasia
Shan (Northern Shan dialect)	Tai-Kadai	Warm temperate	Eurasia
Shipibo-Conibo	Pano-Tacanan	Equatorial	South America
Siona	Tucanoan	Equatorial	South America
Sirion	Tupian	Equatorial	South America
Southern Kam	Tai-Kadai	Warm temperate	Eurasia
Southern Thai (Songkhla variety)	Tai-Kadai	Equatorial	Eurasia
Spanish	Indo-European	Warm temperate	Eurasia
Sui	Tai-Kadai	Warm temperate	Eurasia
Swedish	Indo-European	Snow	Eurasia
Tabasaran (Northern dialect, Khanag subdialect)	Nakh-Daghestanian	Snow	Eurasia
Tacana	Pano-Tacanan	Equatorial	South America
Tai Khn	Tai-Kadai	Equatorial	Eurasia
Tai L	Tai-Kadai	Warm temperate	Eurasia
Tamil	Dravidian	Equatorial	Eurasia

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Tehuelche	Chonan	Arid	South America
Telugu	Dravidian	Arid	Eurasia
Thai (Korat dialect)	Tai-Kadai	Equatorial	Eurasia
Thavung So	Austroasiatic	Equatorial	Eurasia
Tibetan	Sino-Tibetan	Polar	Eurasia
Tindi	Nakh-Daghestanian	Snow	Eurasia
Tlingit	Athapaskan-Eyak-Tlingit	Snow	North America
Toba	Guaicuruan	Warm temperate	South America
Tongan	Austronesian	Warm temperate	Papunesia
Trinitario	Arawakan	Equatorial	South America
Tsakhur	Nakh-Daghestanian	Snow	Eurasia
Tsakhur (Gelmets dialect)	Nakh-Daghestanian	Snow	Eurasia
Tsez (Mokok dialect)	Nakh-Daghestanian	Snow	Eurasia
Tsimshian	Tsimshian	Warm temperate	North America
Tsova-Tush	Nakh-Daghestanian	Snow	Eurasia
Tuamotuan	Austronesian	Warm temperate	Papunesia
Tuyuca	Tucanoan	Equatorial	South America
Udi	Nakh-Daghestanian	Warm temperate	Eurasia
Udmurt	Uralic	Snow	Eurasia
Uncunwee	Nubian	Arid	Africa
Upper Chehalis	Salishan	Warm temperate	North America
Vietnamese	Austroasiatic	Warm temperate	Eurasia
Wa	Austroasiatic	Warm temperate	Eurasia
Wai Wai	Cariban	Equatorial	South America
Wapishana	Arawakan	Equatorial	South America
Waur	Arawakan	Equatorial	South America
Wayampi	Tupian	Equatorial	South America
Welsh	Indo-European	Warm temperate	Eurasia
Wich	Matacoan	Warm temperate	South America
Xu	Austroasiatic	Warm temperate	Eurasia
Yagua	Peba-Yagua	Equatorial	South America
Yaminahua	Pano-Tacanan	Equatorial	South America
Yanommi	Yanomam	Equatorial	South America
Yavitero	Arawakan	Equatorial	South America
Yiddish	Indo-European	Warm temperate	Eurasia
Yuwana	Jodi-Saliban	Equatorial	South America
Zhuang-Longzhou	Tai-Kadai	Warm temperate	Eurasia

Table S2: Phrase-based concepts in the IDS excluded for analysis.

Sense
IDS sense
young man (adolescent)
young woman (adolescent)
married man
married woman
older brother
younger brother
older sister
younger sister
old man
old woman
mother's brother
father's brother
mother's sister
father's sister
father-in-law (of a man)
father-in-law (of a woman)
mother-in-law (of a man)
mother-in-law (of a woman)
son-in-law (of a man)
son-in-law (of a woman)
daughter-in-law (of a man)
daughter-in-law (of a woman)
he-goat
freshwater eel
spider web
body hair
pubic hair
side of head, temple
nape of neck
palm of hand
calf of leg
wake up
break wind
have sexual intercourse
pot, cooking vessel
cup, drinking vessel
chili pepper

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fermented drink
egg yolk
put on (clothes)
woman's dress
grass-skirt
garden-house
men's house
meeting house
latch, door-bolt
threshing-floor
tree stump
tree trunk
forked branch
palm tree
citrus fruit
banana tree
sweet potato
sugar cane
fish poison (root)
pound with fist
cut down
spread out
hang up
hollow out
turn over
turn around
go up
go down
go out
come back
carry-in-hand
carry-on-shoulder
carry-on-head
carry-underarm
give back
lie down
pick up
pile up
two times
three times
long-time (for a)
day-after-tomorrow
day-before-yesterday

Continued on next page

fragrant, good smelling
stinking, bad smelling
how many?
how much?
tell story
one's native country
battle-ax
fishing line
fish trap

Table S3: 100 most frequent pairs of colexified concepts in English glosses, controlled for language family, climate, and geography. Concept pairs marked in bold are those that did not display direct association in the Human Brain Cloud data.

Family-controlled	**Climate-controlled**	**Geography-controlled**
moon month	flesh meat	moon month
flesh meat	high tall	leg foot
tree (cf 08.600) wood	fingernail claw	woman female
high tall	moon month	fingernail claw
man (vs. woman) male	skin, hide leather	arm hand
grandson granddaughter	dish plate	man (vs. woman) male
woman female	leg foot	skin, hide leather
fingernail claw	oar paddle (noun)	road path
skin, hide leather	grandson granddaughter	earth, land country
language word	sea ocean	grandson granddaughter
dish plate	catch (ball) seize, grasp	sky heaven
wood tree	arm hand	tree (cf 08.600) wood
hear listen	road path	air wind
road path	woman female	high tall
leg foot	girl daughter	share (distribute) divide
sky heaven	man (vs. woman) male	girl daughter
child infant, baby	sound, noise voice	dwell, live sit
sea	blue	dish

Continued on next page

ocean	green	plate
arm hand	gourd pumpkin, squash	language word
paper book	child infant, baby	roast, fry bake
blue green	sky heaven	sniff smell (vb trans)
earth, land country	language word	sea ocean
air wind	speak, talk say	flesh meat
lake lagoon	hunger famine	oar paddle (noun)
see look, look at	share (distribute) divide	carry (bear) take
walk go	sniff smell (vb trans)	learn study
learn study	breast (of woman) nipple, teat	sun day
oar paddle (noun)	earth, land country	drop (vb) fall
wood **firewood**	seize, grasp hold	man (vs. woman) male (adj)
person, human being people (populace)	tree (cf 08.600) wood	hunger famine
woman female (adj)	hear listen	**disappear** **lose**
sun day	food meal (a)	face eye
catch (ball) seize, grasp	sow plant (vb)	dish bowl
go go away, depart	lake lagoon	dwell, live remain, stay
man (vs. woman) male (adj)	boy child	separate divide
clothing, clothes cloth	wood tree	catch (ball) seize, grasp
laugh smile	tongue language	stomach womb
sow plant (vb)	jaw chin	go go away, depart
world	**wood**	hear

Continued on next page

earth, land	**firewood**	listen
voice **language**	person, human being man (vs. woman)	see look, look at
boat canoe	hot warm	wood tree
do, make build	ship boat	woman wife
have own, possess	have own, possess	walk go
food meal (a)	spade shovel	person, human being people (populace)
boy child	find meet	**hair (head)** **feather**
fur leather	take seize, grasp	dinner supper
round circle	woman wife	darkness dark (in color)
raw green, unripe	sun day	fowl chicken
dish bowl	float swim	child infant, baby
understand know	woman female (adj)	boy child
girl daughter	catch (ball) hold	sow plant (vb)
sound, noise voice	hour clock, timepiece	raw green, unripe
hunger famine	walk go	**call (=summon)** **call (=name)**
fowl bird	house hut	rise climb
breast (of woman) nipple, teat	go go away, depart	lame limp
brother sibling	keep, retain preserve, look after	child offspring (son or daughter)
find meet	person, human being people (populace)	brother cousin
oil grease, fat	learn study	**skin, hide** **bark**
mud clay	brother sibling	ship boat
woman	peel	mud

Continued on next page

wife	flay, skin	clay
separate divide	oven stove	oil grease, fat
take seize, grasp	darkness night	tongue language
spade shovel	catch (ball) trap (vb)	brother sister
brother sister	child offspring (son or daughter)	hair (head) fur
son offspring (son or daughter)	paper book	fault mistake, error
nephew niece	boy son	world earth, land
money coin	quiet, silence silent (be)	hen chicken
city, town village	roast, fry bake	**bend** **crooked**
cloud fog	mud clay	spade shovel
field (for cultivation) **garden**	burn (vb trans) light, kindle, ignite	sister cousin
good right, correct	seize, grasp trap (vb)	hear feel
sniff smell (vb trans)	livestock cattle (bovine)	understand know
silver money	sister sibling	fowl hen
ship boat	bad ugly	clothing, clothes cloth
good **beautiful**	nose beak	feather fur
livestock cattle (bovine)	neck throat	woman female (adj)
two pair	**catch (ball)** **take**	sit remain, stay
man (vs. woman) husband	ask (question, inquire) ask, request	bitter acid, sour
dark (in color) black	air wind	**wood** **firewood**
run flee	end (temporal) finish	boat canoe
mind	money	hot

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idea, notion	coin	warm
peel flay, skin	paint (noun) color	weigh measure
weigh measure	husband wife	kill murder
skin, hide **bark**	skin, hide fur	breast (of woman) milk (noun)
rise climb	dish bowl	nephew niece
narrow thin (in dimension)	**master** **host**	roof thatch
take get, obtain	fur leather	speak, talk word
seed grain (barley, oats etc)	do, make build	learn teach
plate bowl	boat canoe	quiet, silence silent (be)
catch (ball) **take**	man (vs. woman) husband	do, make build
person, human being man (vs. woman)	steal thief	round circle
late afternoon	take get, obtain	bad ugly
skin, hide fur	nephew niece	end (temporal) finish
quiet, silence silent (be)	raw green, unripe	shout, cry out shriek, screech
hair (head) **feather**	bright light (in color)	**good** **beautiful**
earth, land **floor**	**light (in weight)** **easy**	female wife
speak, talk say	silver money	paper book
bad ugly	run flee	take seize, grasp
boy son	dye paint (noun)	blue green
jaw chin	bull ox	**share (distribute)** **separate**

Table S4: 100 most strongly associated pairs of concepts from the Human Brain Cloud data. Concept pairs marked in bold are those that were not attested in cross-linguistic colexification, controlled for language family, climate, and geography.

Family-controlled	**Climate-controlled**	**Geography-controlled**
husband wife	husband wife	husband wife
buy sell	buy sell	buy sell
east **west**	**east** **west**	**east** **west**
salt **pepper**	**salt** **pepper**	**salt** **pepper**
dog cat	dog cat	dog cat
boy girl	boy girl	boy girl
good **bad**	**good** **bad**	**good** **bad**
take give	take give	take give
man (vs. woman) **woman**	**man (vs. woman)** **woman**	**man (vs. woman)** **woman**
uncle aunt	uncle aunt	uncle aunt
father **mother**	father mother	father mother
heaven **hell**	**heaven** **hell**	**heaven** **hell**
north south	north south	north south
rich **poor**	**rich** **poor**	**rich** **poor**
brother sister	brother sister	brother sister
pull push, shove	pull push, shove	pull push, shove
top **bottom**	**top** **bottom**	**top** **bottom**

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high **low**	**high** **low**	**high** **low**
white **black**	**white** **black**	**white** **black**
yes, affirmative no, negative	yes, affirmative no, negative	yes, affirmative no, negative
nephew niece	nephew niece	nephew niece
love **hate**	**love** **hate**	**love** **hate**
gold silver	gold silver	gold silver
lock (noun) key	lock (noun) key	lock (noun) key
new **old**	**new** **old**	**new** **old**
arm leg	arm leg	arm leg
remember **forget**	**remember** **forget**	**remember** **forget**
tall **short**	**tall** **short**	**tall** **short**
day night	day night	day night
eleven **twelve**	**eleven** **twelve**	**eleven** **twelve**
full **empty**	**full** **empty**	**full** **empty**
sweep broom	sweep broom	sweep broom
son daughter	son daughter	son daughter
young **old**	**young** **old**	**young** **old**
read **book**	**read** **book**	**read** **book**
forgive forget	forgive forget	forgive forget
six **seven**	**six** **seven**	**six** **seven**
time	time	time

Continued on next page

clock, timepiece	clock, timepiece	clock, timepiece
walk **run**	**walk** **run**	**walk** **run**
bow arrow	bow arrow	bow arrow
needle **thread**	**needle** **thread**	**needle** **thread**
guilty **innocent**	**guilty** **innocent**	**guilty** **innocent**
thick (in dimension) **thin (in dimension)**	**thick (in dimension)** **thin (in dimension)**	**thick (in dimension)** **thin (in dimension)**
one **two**	**one** **two**	**one** **two**
hard **soft**	**hard** **soft**	**hard** **soft**
right (side) **wrong**	**right (side)** **wrong**	**right (side)** **wrong**
king, ruler queen	king, ruler queen	king, ruler queen
hear listen	hear listen	hear listen
learn teach	learn teach	learn teach
touch feel	touch feel	touch feel
sheep wool	sheep wool	sheep wool
lightning thunder	lightning thunder	lightning thunder
thunder lightning (as striking)	thunder lightning (as striking)	thunder lightning (as striking)
danger **stranger**	**danger** **stranger**	**danger** **stranger**
fire **arson**	**fire** **arson**	**fire** **arson**
hammer nail	hammer nail	hammer nail
square **circle**	**square** **circle**	**square** **circle**
sky blue	sky blue	sky blue
nine	**nine**	**nine**

Continued on next page

ten	**ten**	**ten**
fire **extinguish**	**fire** **extinguish**	**fire** **extinguish**
kill murder	kill murder	kill murder
bee honey	bee honey	bee honey
lend borrow	lend borrow	lend borrow
male **female**	**male** **female**	**male** **female**
male **female (adj)**	**male** **female (adj)**	**male** **female (adj)**
male (adj) **female (adj)**	**male (adj)** **female (adj)**	**male (adj)** **female (adj)**
female **male (adj)**	**female** **male (adj)**	**female** **male (adj)**
hard **easy**	**hard** **easy**	**hard** **easy**
nose nostril	nose nostril	nose nostril
swear curse	swear curse	swear curse
fall autumn	fall autumn	fall autumn
hair (head) braid	hair (head) braid	hair (head) braid
bee wasp	bee wasp	bee wasp
hundred **thousand**	**hundred** **thousand**	**hundred** **thousand**
two pair	two pair	two pair
cold (catarrh) **hot**	**cold (catarrh)** **hot**	**cold (catarrh)** **hot**
hot **cold**	**hot** **cold**	**hot** **cold**
begin, beginning **end (temporal)**	**begin, beginning** **end (temporal)**	**begin, beginning** **end (temporal)**
end begin, beginning	end begin, beginning	end begin, beginning
earthquake	earthquake	earthquake

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shake	shake	shake
eat food	eat food	eat food
sugar sweet	sugar sweet	sugar sweet
eight **nine**	**eight** **nine**	**eight** **nine**
eye **blink**	**eye** **blink**	**eye** **blink**
go **cease, stop**	**go** **cease, stop**	**go** **cease, stop**
boat **sail (noun)**	**boat** **sail (noun)**	**boat** **sail (noun)**
sail (vb) **boat**	**sail (vb)** **boat**	**sail (vb)** **boat**
go come	go come	go come
master **slave**	**master** **slave**	**master** **slave**
go ready	go ready	go ready
drop (vb) drip	drop (vb) drip	drop (vb) drip
spoon fork (2)	spoon fork (2)	spoon fork (2)
spoon **fork**	**spoon** **fork**	**spoon** **fork**
goose duck	goose duck	goose duck
bread **rye**	**bread** **rye**	**bread** **rye**
saw **see**	**saw** **see**	**saw** **see**
dark (in color) **light (in weight)**	**dark (in color)** **light (in weight)**	**dark (in color)** **light (in weight)**
light (in color) **dark (in color)**	**light (in color)** **dark (in color)**	**light (in color)** **dark (in color)**
light (noun) **dark (in color)**	**light (noun)** **dark (in color)**	**light (noun)** **dark (in color)**
wolf **howl**	**wolf** **howl**	**wolf** **howl**

Table S5: 100 most similar pairs of concepts from the pre-trained word2vec embeddings. Concept pairs marked in bold are those that were not attested in cross-linguistic colexification, controlled for language family, climate, and geography.

Family-controlled	**Climate-controlled**	**Geography-controlled**
ask (question, inquire) ask, request	ask (question, inquire) ask, request	ask (question, inquire) ask, request
light (in color) light (in weight)	light (in color) light (in weight)	light (in color) light (in weight)
light, kindle, ignite light (in weight)	light, kindle, ignite light (in weight)	light, kindle, ignite light (in weight)
light (noun) light (in weight)	light (noun) light (in weight)	light (noun) light (in weight)
call (=summon) call (=name)	call (=summon) call (=name)	call (=summon) call (=name)
three **four**	three four	three four
north south	north south	north south
east **west**	**east** **west**	**east** **west**
seven **eight**	**seven** **eight**	**seven** **eight**
four five	four five	four five
five **seven**	**five** **seven**	**five** **seven**
six **seven**	**six** **seven**	**six** **seven**
five six	five six	five six
four **seven**	**four** **seven**	**four** **seven**
four six	four six	four six
six **eight**	**six** **eight**	**six** **eight**
east **north**	**east** **north**	**east** **north**
west	**west**	**west**

Continued on next page

north	**north**	**north**
five **eight**	**five** **eight**	**five** **eight**
four **eight**	**four** **eight**	**four** **eight**
three **five**	**three** **five**	**three** **five**
east **south**	**east** **south**	**east** **south**
seven **nine**	**seven** **nine**	**seven** **nine**
eight **nine**	**eight** **nine**	**eight** **nine**
west south	west south	west south
two three	two three	two three
six **nine**	**six** **nine**	**six** **nine**
three **six**	**three** **six**	**three** **six**
three **seven**	**three** **seven**	**three** **seven**
three **eight**	**three** **eight**	**three** **eight**
five **nine**	**five** **nine**	**five** **nine**
two **four**	**two** **four**	**two** **four**
knee ankle	knee ankle	knee ankle
father **son**	**father** **son**	**father** **son**
second third	second third	second third
four **nine**	**four** **nine**	**four** **nine**
morning **afternoon**	**morning** **afternoon**	**morning** **afternoon**
fifteen **twenty**	**fifteen** **twenty**	**fifteen** **twenty**
grandmother	grandmother	grandmother

Continued on next page

aunt	aunt	aunt
three **nine**	**three** **nine**	**three** **nine**
mother **daughter**	**mother** **daughter**	**mother** **daughter**
daughter niece	daughter niece	daughter niece
granddaughter niece	granddaughter niece	granddaughter niece
boy girl	boy girl	boy girl
father uncle	father uncle	father uncle
son nephew	son nephew	son nephew
daughter **granddaughter**	daughter granddaughter	daughter granddaughter
uncle nephew	uncle nephew	uncle nephew
son daughter	son daughter	son daughter
ten **fifteen**	**ten** **fifteen**	**ten** **fifteen**
mother grandmother	mother grandmother	mother grandmother
mother aunt	mother aunt	mother aunt
son **grandson**	**son** **grandson**	**son** **grandson**
male **female**	**male** **female**	**male** **female**
male **female (adj)**	**male** **female (adj)**	**male** **female (adj)**
male (adj) **female (adj)**	**male (adj)** **female (adj)**	**male (adj)** **female (adj)**
female **male (adj)**	**female** **male (adj)**	**female** **male (adj)**
two **five**	**two** **five**	**two** **five**
grandson granddaughter	grandson granddaughter	grandson granddaughter
son	**son**	**son**

Continued on next page

brother	**brother**	**brother**
week **month**	**week** **month**	**week** **month**
hundred **thousand**	**hundred** **thousand**	**hundred** **thousand**
aunt niece	aunt niece	aunt niece
gold silver	gold silver	gold silver
buy sell	buy sell	buy sell
brother **nephew**	**brother** **nephew**	**brother** **nephew**
husband wife	husband wife	husband wife
father **brother**	**father** **brother**	**father** **brother**
two **six**	**two** **six**	**two** **six**
grandmother granddaughter	grandmother granddaughter	grandmother granddaughter
ten **twenty**	ten twenty	ten twenty
brother uncle	brother uncle	brother uncle
grandfather uncle	grandfather uncle	grandfather uncle
livestock cattle (bovine)	livestock cattle (bovine)	livestock cattle (bovine)
grandson nephew	grandson nephew	grandson nephew
night evening	night evening	night evening
white **black**	**white** **black**	**white** **black**
afternoon evening	afternoon evening	afternoon evening
mother **niece**	**mother** **niece**	**mother** **niece**
two seven	two seven	two seven
father	father	father

Continued on next page

grandfather	grandfather	grandfather
two **eight**	**two** **eight**	**two** **eight**
grandfather grandson	grandfather grandson	grandfather grandson
brother cousin	brother cousin	brother cousin
first **second**	**first** **second**	**first** **second**
grandmother **niece**	**grandmother** **niece**	**grandmother** **niece**
stepfather stepson	stepfather stepson	stepfather stepson
lake river, stream, brook	lake river, stream, brook	lake river, stream, brook
father **mother**	father mother	father mother
nephew cousin	nephew cousin	nephew cousin
father **nephew**	**father** **nephew**	**father** **nephew**
son **uncle**	**son** **uncle**	**son** **uncle**
daughter **sister**	**daughter** **sister**	**daughter** **sister**
father stepfather	father stepfather	father stepfather
uncle cousin	uncle cousin	uncle cousin
porpoise, dolphin **whale**	**porpoise, dolphin** **whale**	**porpoise, dolphin** **whale**
daughter stepdaughter	daughter stepdaughter	daughter stepdaughter
elbow knee	elbow knee	elbow knee
grandson **uncle**	**grandson** **uncle**	**grandson** **uncle**
mother **son**	mother son	mother son

Table S6: All concept pairs with directly identifiable superordinate-subordinate relations in the IDS. Concept pairs marked in bold are attested in colexification across languages.

Superordinate concept	Subordinate concept
earth, land	**plain, field**
earth, land	**island**
earth, land	**mainland**
earth, land	headland, point
lake	**lagoon**
tide	lowtide
tide	hightide
sound, noise	**thunder**
lightning	**lightning (as striking)**
weather	**wind**
man (vs. woman)	young man (adolescent)
man (vs. woman)	old man
man (vs. woman)	**widower**
woman	young woman (adolescent)
woman	**wife**
woman	married woman
woman	old woman
woman	**widow**
woman	**prostitute**
offspring (son or daughter)	**infant, baby**
parents	father
parents	mother
brother	older brother
brother	younger brother
sister	older sister
sister	younger sister
relatives, kinsmen	sibling
relatives, kinsmen	cousin
relatives, kinsmen	ancestors
sibling	twins
child	**orphan**
person, human being	relatives, kinsmen
person, human being	**slave**
person, human being	**friend, companion**
person, human being	**neighbor**
person, human being	**stranger**

Continued on next page

tribe, clan	**family**
cattle (bovine)	**bull**
cattle (bovine)	**ox**
cattle (bovine)	**cow**
sheep	**ram**
sheep	ewe
goat	he-goat
goat	**kid**
horse (equine)	**mare**
chicken	**cock, rooster**
chicken	**hen**
fowl	**chicken**
bird	**parrot**
insect	**flea**
hair (head)	body hair
hair (head)	pubic hair
hair (head)	**eyebrow**
hair (head)	**eyelash**
bone	**rib**
bone	**skull**
bone	**jaw**
bone	**tooth**
bone	shoulderblade
bone	**collarbone**
tooth	molartooth
finger	**thumb**
rest	**sleep**
die, dead	drowned
drink	**suck**
pot, cooking vessel	kettle
meal (a)	**breakfast**
meal (a)	**lunch**
meal (a)	**dinner**
meal (a)	**supper**
rub, wipe	**scrape**
food	**meat**
food	**cheese**
food	**butter**
meat	**sausage**
fruit	**olive**
fruit	**acorn**
beverage, drink	**milk (noun)**
cloth	**linen, flax**

Continued on next page

cloth	**cotton**
cloth	**silk**
cloth	felt
cloak	**poncho**
skirt	grass-skirt
headband, headdress	**hat, cap**
headband, headdress	**helmet**
beam	ridgepole
beam	rafter
brick	**adobe**
put	**sow**
put	**plant (vb)**
cut	**mow, reap**
cut	cut down
cut	**chop, hew**
cut	bore
cut	**carve**
strike (hit, beat)	thresh
tree (cf 08.600)	**oak**
tree	**oak**
tree (cf 08.600)	beech
tree	beech
tree (cf 08.600)	**birch**
tree	**birch**
tree (cf 08.600)	palm tree
tree	palm tree
root	tapioca, manioc, cassava
vegetables	pumpkin, squash
wood	**bamboo**
separate	**cut**
separate	**tear**
harm, injure, damage	**stab**
harm, injure, damage	**shoot**
peel	**flay, skin**
press	**squeeze, wring**
weave	**weave, plait**
go down	drip
swim	**dive**
walk	**limp**
rise	**climb**
carry (bear)	**bring**
oar	**paddle (noun)**
rudder	**paddle (noun)**

Continued on next page

pay (vb)	give back
give	**lend**
give	**pay (vb)**
season	**winter**
season	**spring**
season	**summer**
season	**autumn**
smell (vb trans)	**sniff**
keep, retain	**deny**
command, order	**call (=summon)**
country	one's native country
line	**boundary**
citizen, subject	**freeman**
weapons, arms	sling
weapons, arms	bow
weapons, arms	spear
weapons, arms	sword
weapons, arms	gun, cannon
armor (defensive)	**shield**
hook	fishhook

Table S7: All concept pairs with identifiable co-hyponym relations in the IDS along with their shared hypernyms in WordNet. Concept pairs marked in bold are attested in colexification across languages.

Concept 1	Concept 2	Shared hypernym
hasten, hurry	dare	act.v.01
hasten, hurry	try, attempt	act.v.01
dare	**try, attempt**	**act.v.01**
blink	sneeze	act_involuntarily.v.01
blink	break wind	act_involuntarily.v.01
sneeze	break wind	act_involuntarily.v.01
man (vs. woman)	woman	adult.n.01
man (vs. woman)	host	adult.n.01
woman	host	adult.n.01
flesh	gums	animal_tissue.n.01
goose	**duck**	**anseriform_bird.n.01**
scorpion	**spider**	**arachnid.n.01**
palm of hand	waist	area.n.03
yard, court	**room**	**area.n.05**
yard, court	threshing-floor	area.n.05
yard, court	corner	area.n.05
room	threshing-floor	area.n.05
room	corner	area.n.05
threshing-floor	corner	area.n.05
lip	tongue	articulator.n.02
storm	cloud	atmospheric_phenomenon.n.01
storm	**weather**	**atmospheric_phenomenon.n.01**
cloud	weather	atmospheric_phenomenon.n.01
owe	remain, stay	be.v.01
owe	seem	be.v.01
remain, stay	seem	be.v.01
ridgepole	rafter	beam.n.02
eagle	**hawk**	**bird_of_prey.n.01**
eagle	owl	bird_of_prey.n.01
hawk	**owl**	**bird_of_prey.n.01**
sail (vb)	**row (vb)**	**boat.v.01**
skin, hide	hair (head)	body_covering.n.01
skin, hide	feather	body_covering.n.01
hair (head)	**feather**	**body_covering.n.01**
sea	**ocean**	**body_of_water.n.01**
sea	**lake**	**body_of_water.n.01**

Continued on next page

sea	**gulf, bay**	**body_of_water.n.01**
sea	**river, stream, brook**	**body_of_water.n.01**
sea	waterfall	body_of_water.n.01
ocean	**lake**	**body_of_water.n.01**
ocean	**gulf, bay**	**body_of_water.n.01**
ocean	**river, stream, brook**	**body_of_water.n.01**
ocean	waterfall	body_of_water.n.01
lake	gulf, bay	body_of_water.n.01
lake	**river, stream, brook**	**body_of_water.n.01**
lake	waterfall	body_of_water.n.01
gulf, bay	river, stream, brook	body_of_water.n.01
gulf, bay	waterfall	body_of_water.n.01
river, stream, brook	**waterfall**	**body_of_water.n.01**
back	**shoulder**	**body_part.n.01**
back	chest	body_part.n.01
back	**hip**	**body_part.n.01**
back	**buttocks**	**body_part.n.01**
shoulder	chest	body_part.n.01
shoulder	hip	body_part.n.01
shoulder	buttocks	body_part.n.01
chest	hip	body_part.n.01
chest	buttocks	body_part.n.01
hip	**buttocks**	**body_part.n.01**
rib	skull	bone.n.01
rib	jaw	bone.n.01
rib	tooth	bone.n.01
rib	shoulderblade	bone.n.01
rib	collarbone	bone.n.01
skull	jaw	bone.n.01
skull	tooth	bone.n.01
skull	shoulderblade	bone.n.01
skull	collarbone	bone.n.01
jaw	tooth	bone.n.01
jaw	shoulderblade	bone.n.01
jaw	collarbone	bone.n.01
tooth	shoulderblade	bone.n.01
tooth	collarbone	bone.n.01
shoulderblade	collarbone	bone.n.01
sheep	**goat**	**bovid.n.01**
yawn, gape	hiccough	breathe.v.01
yawn, gape	**snore**	**breathe.v.01**
hiccough	snore	breathe.v.01
mead	beer	brew.n.01

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older brother	younger brother	brother.n.01
house	school	building.n.01
dog	wolf	canine.n.02
dog	fox	canine.n.02
wolf	**fox**	**canine.n.02**
hunt	trap (vb)	capture.v.06
east	west	cardinal_compass_point.n.01
east	north	cardinal_compass_point.n.01
east	south	cardinal_compass_point.n.01
west	north	cardinal_compass_point.n.01
west	**south**	**cardinal_compass_point.n.01**
north	**south**	**cardinal_compass_point.n.01**
bull	**ox**	**cattle.n.01**
bull	**cow**	**cattle.n.01**
ox	**cow**	**cattle.n.01**
grain (barley, oats etc)	**wheat**	**cereal.n.01**
grain (barley, oats etc)	**barley**	**cereal.n.01**
grain (barley, oats etc)	**rye**	**cereal.n.01**
grain (barley, oats etc)	oats	cereal.n.01
grain (barley, oats etc)	**maize, corn**	**cereal.n.01**
grain (barley, oats etc)	**rice**	**cereal.n.01**
wheat	**barley**	**cereal.n.01**
wheat	**rye**	**cereal.n.01**
wheat	oats	cereal.n.01
wheat	maize, corn	cereal.n.01
wheat	rice	cereal.n.01
barley	**rye**	**cereal.n.01**
barley	oats	cereal.n.01
barley	maize, corn	cereal.n.01
barley	rice	cereal.n.01
rye	oats	cereal.n.01
rye	maize, corn	cereal.n.01
rye	**rice**	**cereal.n.01**
oats	maize, corn	cereal.n.01
oats	rice	cereal.n.01
maize, corn	rice	cereal.n.01
burn (vb trans)	divide	change_integrity.v.01
sink	sit	change_posture.v.01
sink	lie down	change_posture.v.01
sit	lie down	change_posture.v.01
burn (vb intrans)	wake up	change_state.v.01
burn (vb intrans)	born (to be)	change_state.v.01
burn (vb intrans)	conceive	change_state.v.01

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burn (vb intrans)	die, dead	change_state.v.01
burn (vb intrans)	**boil (vb)**	**change_state.v.01**
wake up	born (to be)	change_state.v.01
wake up	conceive	change_state.v.01
wake up	die, dead	change_state.v.01
wake up	boil (vb)	change_state.v.01
born (to be)	**conceive**	**change_state.v.01**
born (to be)	**die, dead**	**change_state.v.01**
born (to be)	boil (vb)	change_state.v.01
conceive	die, dead	change_state.v.01
conceive	boil (vb)	change_state.v.01
die, dead	boil (vb)	change_state.v.01
cock, rooster	**hen**	**chicken.n.02**
wash	sweep	clean.v.01
clothing, clothes	headband, headdress	clothing.n.01
fire	**flame (noun)**	**combustion.n.01**
whistle	**speak, talk**	**communicate.v.02**
whistle	write	communicate.v.02
speak, talk	write	communicate.v.02
voice	**language**	**communication.n.02**
silver	**copper, bronze**	**conductor.n.02**
pine	**fir**	**conifer.n.01**
eat	**drink**	**consume.v.02**
eat	swallow	consume.v.02
eat	**smoke (tobacco)**	**consume.v.02**
drink	**swallow**	**consume.v.02**
drink	**smoke (tobacco)**	**consume.v.02**
swallow	smoke (tobacco)	consume.v.02
dish	cup, drinking vessel	container.n.01
dish	**spoon**	**container.n.01**
dish	**trough**	**container.n.01**
dish	**basket**	**container.n.01**
cup, drinking vessel	spoon	container.n.01
cup, drinking vessel	trough	container.n.01
cup, drinking vessel	basket	container.n.01
spoon	trough	container.n.01
spoon	basket	container.n.01
trough	basket	container.n.01
pot, cooking vessel	pan	cooking_utensil.n.01
thread	fishing line	cord.n.01
fishscale	shell	covering.n.01
fishscale	bark	covering.n.01
shell	**bark**	**covering.n.01**

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mason	potter	craftsman.n.03
cook	**bake**	**create_from_raw_material.v.01**
cook	weave	create_from_raw_material.v.01
bake	weave	create_from_raw_material.v.01
dish	cup, drinking vessel	crockery.n.01
mow, reap	cut down	cut.v.01
mow, reap	**chop, hew**	**cut.v.01**
mow, reap	bore	cut.v.01
mow, reap	**carve**	**cut.v.01**
cut down	chop, hew	cut.v.01
cut down	bore	cut.v.01
cut down	carve	cut.v.01
chop, hew	bore	cut.v.01
chop, hew	**carve**	**cut.v.01**
bore	carve	cut.v.01
spoon	**fork (2)**	**cutlery.n.02**
milk (noun)	**cheese**	**dairy_product.n.01**
milk (noun)	butter	dairy_product.n.01
cheese	**butter**	**dairy_product.n.01**
afternoon	**evening**	**day.n.04**
measure	**choose**	**decide.v.01**
promise	condemn	declare.v.01
tongs	comb	device.n.01
tongs	key	device.n.01
tongs	fan (noun)	device.n.01
tongs	bait	device.n.01
tongs	trap (noun)	device.n.01
comb	key	device.n.01
comb	fan (noun)	device.n.01
comb	bait	device.n.01
comb	trap (noun)	device.n.01
key	fan (noun)	device.n.01
key	bait	device.n.01
key	trap (noun)	device.n.01
fan (noun)	bait	device.n.01
fan (noun)	trap (noun)	device.n.01
bait	**trap (noun)**	**device.n.01**
finger	**toe**	**digit.n.03**
fly	**mosquito**	**dipterous_insect.n.01**
knife (2)	**razor**	**edge_tool.n.01**
knife (2)	sickle, scythe	edge_tool.n.01
knife (2)	**knife**	**edge_tool.n.01**
knife (2)	ax	edge_tool.n.01

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knife (2)	adze	edge_tool.n.01
knife (2)	**chisel**	**edge_tool.n.01**
razor	sickle, scythe	edge_tool.n.01
razor	**knife**	**edge_tool.n.01**
razor	ax	edge_tool.n.01
razor	adze	edge_tool.n.01
razor	**chisel**	**edge_tool.n.01**
sickle, scythe	knife	edge_tool.n.01
sickle, scythe	ax	edge_tool.n.01
sickle, scythe	adze	edge_tool.n.01
sickle, scythe	**chisel**	**edge_tool.n.01**
knife	ax	edge_tool.n.01
knife	adze	edge_tool.n.01
knife	**chisel**	**edge_tool.n.01**
ax	adze	edge_tool.n.01
ax	chisel	edge_tool.n.01
adze	chisel	edge_tool.n.01
fig	**grape**	**edible_fruit.n.01**
fig	citrus fruit	edible_fruit.n.01
fig	banana tree	edible_fruit.n.01
grape	citrus fruit	edible_fruit.n.01
grape	banana tree	edible_fruit.n.01
citrus fruit	banana tree	edible_fruit.n.01
anxiety, worry	**fear, fright**	**emotion.n.01**
finish	judge (vb)	end.v.02
end (temporal)	victory	ending.n.04
end (temporal)	defeat	ending.n.04
victory	**defeat**	**ending.n.04**
horse (equine)	**mule**	**equine.n.01**
spring, well	**ditch**	**excavation.n.03**
sell	**trade, barter**	**exchange.v.01**
perspire	vomit	excrete.v.01
perspire	urinate	excrete.v.01
perspire	defecate	excrete.v.01
vomit	urinate	excrete.v.01
vomit	defecate	excrete.v.01
urinate	defecate	excrete.v.01
cough	spit	expectorate.v.02
laugh	cry, weep	express_emotion.v.01
head	face	external_body_part.n.01
head	lip	external_body_part.n.01
head	neck	external_body_part.n.01
face	**lip**	**external_body_part.n.01**

Continued on next page

face	neck	external_body_part.n.01
lip	neck	external_body_part.n.01
hand	**finger**	**extremity.n.05**
hand	toe	extremity.n.05
finger	**toe**	**extremity.n.05**
linen, flax	**cotton**	**fabric.n.01**
linen, flax	silk	fabric.n.01
linen, flax	felt	fabric.n.01
cotton	**silk**	**fabric.n.01**
cotton	felt	fabric.n.01
silk	felt	fabric.n.01
sew	tie, bind	fasten.v.01
sew	hang up	fasten.v.01
tie, bind	hang up	fasten.v.01
button	lock (noun)	fastener.n.02
button	**knot (noun)**	**fastener.n.02**
button	**nail**	**fastener.n.02**
lock (noun)	knot (noun)	fastener.n.02
lock (noun)	nail	fastener.n.02
knot (noun)	nail	fastener.n.02
side of head, temple	forehead	feature.n.02
side of head, temple	cheek	feature.n.02
side of head, temple	chin	feature.n.02
forehead	cheek	feature.n.02
forehead	chin	feature.n.02
cheek	**chin**	**feature.n.02**
woman	**girl**	**female.n.02**
plate	**saucer**	**flatware.n.01**
salt	pepper	flavorer.n.01
mat	**rug**	**floor_cover.n.01**
water	**beverage, drink**	**food.n.01**
meat	cheese	food.n.02
meat	butter	food.n.02
cheese	**butter**	**food.n.02**
meal, flour	egg	foodstuff.n.02
shoe	**boot**	**footwear.n.02**
good fortune, luck	**misfortune, bad luck**	**fortune.n.04**
olive	acorn	fruit.n.01
firewood	charcoal	fuel.n.01
fur	**shirt**	**garment.n.01**
fur	skirt	garment.n.01
fur	trousers	garment.n.01
fur	veil	garment.n.01

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shirt	**skirt**	**garment.n.01**
shirt	trousers	garment.n.01
shirt	veil	garment.n.01
skirt	trousers	garment.n.01
skirt	veil	garment.n.01
trousers	veil	garment.n.01
shore	cave	geological_formation.n.01
find	borrow	get.v.01
find	**earn**	**get.v.01**
find	buy	get.v.01
find	share (distribute)	get.v.01
borrow	earn	get.v.01
borrow	buy	get.v.01
borrow	**share (distribute)**	**get.v.01**
earn	buy	get.v.01
earn	share (distribute)	get.v.01
buy	share (distribute)	get.v.01
lend	pay (vb)	give.v.03
wrist	ankle	gliding_joint.n.01
he-goat	kid	goat.n.01
grandson	**granddaughter**	**grandchild.n.01**
grandfather	**grandmother**	**grandparent.n.01**
bite	**pinch**	**grip.v.01**
body hair	pubic hair	hair.n.01
body hair	eyebrow	hair.n.01
body hair	eyelash	hair.n.01
pubic hair	eyebrow	hair.n.01
pubic hair	eyelash	hair.n.01
eyebrow	**eyelash**	**hair.n.01**
pestle	awl	hand_tool.n.01
pestle	shovel	hand_tool.n.01
pestle	fork	hand_tool.n.01
pestle	saw	hand_tool.n.01
pestle	hammer	hand_tool.n.01
awl	shovel	hand_tool.n.01
awl	fork	hand_tool.n.01
awl	saw	hand_tool.n.01
awl	hammer	hand_tool.n.01
shovel	fork	hand_tool.n.01
shovel	saw	hand_tool.n.01
shovel	hammer	hand_tool.n.01
fork	saw	hand_tool.n.01
fork	hammer	hand_tool.n.01

Continued on next page

saw	hammer	hand_tool.n.01
hat, cap	**helmet**	**headdress.n.01**
elbow	**knee**	**hinge_joint.n.01**
pound with fist	kick	hit.v.03
dawn	noon, midday	hour.n.02
ant	**bee**	**hymenopterous_insect.n.01**
ant	**wasp**	**hymenopterous_insect.n.01**
bee	**wasp**	**hymenopterous_insect.n.01**
heaven	hell	imaginary_place.n.01
needle	brush	implement.n.01
needle	oar	implement.n.01
needle	rudder	implement.n.01
needle	**hook**	**implement.n.01**
brush	oar	implement.n.01
brush	rudder	implement.n.01
brush	hook	implement.n.01
oar	**rudder**	**implement.n.01**
oar	hook	implement.n.01
rudder	hook	implement.n.01
show	**teach**	**inform.v.01**
show	**explain**	**inform.v.01**
show	tell story	inform.v.01
show	**announce**	**inform.v.01**
teach	**explain**	**inform.v.01**
teach	tell story	inform.v.01
teach	**announce**	**inform.v.01**
explain	tell story	inform.v.01
explain	**announce**	**inform.v.01**
tell story	announce	inform.v.01
stab	**shoot**	**injure.v.01**
heart	**liver**	**internal_organ.n.01**
heart	**stomach**	**internal_organ.n.01**
heart	intestines, guts	internal_organ.n.01
liver	stomach	internal_organ.n.01
liver	intestines, guts	internal_organ.n.01
stomach	intestines, guts	internal_organ.n.01
jewel	ring (for finger)	jewelry.n.01
jewel	bracelet	jewelry.n.01
jewel	**necklace**	**jewelry.n.01**
jewel	**bead**	**jewelry.n.01**
jewel	earring	jewelry.n.01
ring (for finger)	**bracelet**	**jewelry.n.01**
ring (for finger)	**necklace**	**jewelry.n.01**

Continued on next page

ring (for finger)	bead	jewelry.n.01
ring (for finger)	earring	jewelry.n.01
bracelet	**necklace**	**jewelry.n.01**
bracelet	**bead**	**jewelry.n.01**
bracelet	earring	jewelry.n.01
necklace	**bead**	**jewelry.n.01**
necklace	earring	jewelry.n.01
bead	**earring**	**jewelry.n.01**
uncle	**nephew**	**kinsman.n.01**
aunt	**niece**	**kinswoman.n.01**
oven	**stove**	**kitchen_appliance.n.01**
plain, field	island	land.n.04
plain, field	mainland	land.n.04
plain, field	headland, point	land.n.04
island	**mainland**	**land.n.04**
island	headland, point	land.n.04
mainland	headland, point	land.n.04
word	**name**	**language_unit.n.01**
arm	**leg**	**limb.n.01**
arm	thigh	limb.n.01
leg	**thigh**	**limb.n.01**
oil	**grease, fat**	**lipid.n.01**
water	**beverage, drink**	**liquid.n.01**
blood	pus	liquid_body_substance.n.01
plaintiff	**defendant**	**litigant.n.01**
beget (of father)	build	make.v.03
man (vs. woman)	**boy**	**male.n.02**
breast (of woman)	udder	mammary_gland.n.01
young man (adolescent)	old man	man.n.01
young man (adolescent)	widower	man.n.01
old man	widower	man.n.01
breakfast	**lunch**	**meal.n.01**
breakfast	**dinner**	**meal.n.01**
breakfast	**supper**	**meal.n.01**
lunch	**dinner**	**meal.n.01**
lunch	**supper**	**meal.n.01**
dinner	**supper**	**meal.n.01**
weigh	last, endure	measure.v.03
market (place)	**store, shop**	**mercantile_establishment.n.01**
copper, bronze	**iron**	**metallic_element.n.01**
copper, bronze	**lead (noun)**	**metallic_element.n.01**
iron	lead (noun)	metallic_element.n.01
pull	pour	move.v.02

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pull	turn over	move.v.02
pull	wind, wrap	move.v.02
pull	roll	move.v.02
pull	drop (vb)	move.v.02
pull	raise, lift	move.v.02
pull	**carry (bear)**	**move.v.02**
pull	**push, shove**	**move.v.02**
pull	put	move.v.02
pull	separate	move.v.02
pour	turn over	move.v.02
pour	wind, wrap	move.v.02
pour	roll	move.v.02
pour	**drop (vb)**	**move.v.02**
pour	raise, lift	move.v.02
pour	carry (bear)	move.v.02
pour	push, shove	move.v.02
pour	put	move.v.02
pour	separate	move.v.02
turn over	wind, wrap	move.v.02
turn over	roll	move.v.02
turn over	drop (vb)	move.v.02
turn over	raise, lift	move.v.02
turn over	carry (bear)	move.v.02
turn over	push, shove	move.v.02
turn over	put	move.v.02
turn over	separate	move.v.02
wind, wrap	**roll**	**move.v.02**
wind, wrap	drop (vb)	move.v.02
wind, wrap	raise, lift	move.v.02
wind, wrap	carry (bear)	move.v.02
wind, wrap	push, shove	move.v.02
wind, wrap	put	move.v.02
wind, wrap	separate	move.v.02
roll	drop (vb)	move.v.02
roll	raise, lift	move.v.02
roll	carry (bear)	move.v.02
roll	push, shove	move.v.02
roll	put	move.v.02
roll	separate	move.v.02
drop (vb)	raise, lift	move.v.02
drop (vb)	carry (bear)	move.v.02
drop (vb)	push, shove	move.v.02
drop (vb)	put	move.v.02

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drop (vb)	separate	move.v.02
raise, lift	**carry (bear)**	**move.v.02**
raise, lift	push, shove	move.v.02
raise, lift	**put**	**move.v.02**
raise, lift	**separate**	**move.v.02**
carry (bear)	push, shove	move.v.02
carry (bear)	put	move.v.02
carry (bear)	separate	move.v.02
push, shove	**put**	**move.v.02**
push, shove	separate	move.v.02
put	separate	move.v.02
flow	jump, leap	move.v.03
flow	dance	move.v.03
flow	go out	move.v.03
flow	**go away, depart**	**move.v.03**
jump, leap	**dance**	**move.v.03**
jump, leap	go out	move.v.03
jump, leap	go away, depart	move.v.03
dance	go out	move.v.03
dance	go away, depart	move.v.03
go out	go away, depart	move.v.03
stone, rock	nest	natural_object.n.01
stone, rock	body	natural_object.n.01
nest	body	natural_object.n.01
gold	**silver**	**noble_metal.n.01**
earth, land	earth=ground, soil	object.n.01
earth, land	part, piece	object.n.01
earth=ground, soil	part, piece	object.n.01
old man	old woman	oldster.n.01
tongue	wing	organ.n.01
person, human being	animal	organism.n.01
person, human being	plant (noun)	organism.n.01
animal	plant (noun)	organism.n.01
cloak	**coat**	**overgarment.n.01**
father	**mother**	**parent.n.01**
dream	smell (vb trans)	perceive.v.01
dream	hear	perceive.v.01
dream	listen	perceive.v.01
dream	see	perceive.v.01
smell (vb trans)	**hear**	**perceive.v.01**
smell (vb trans)	**listen**	**perceive.v.01**
smell (vb trans)	see	perceive.v.01
hear	**listen**	**perceive.v.01**

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hear	see	perceive.v.01
listen	see	perceive.v.01
relatives, kinsmen	slave	person.n.01
relatives, kinsmen	friend, companion	person.n.01
relatives, kinsmen	neighbor	person.n.01
relatives, kinsmen	stranger	person.n.01
slave	friend, companion	person.n.01
slave	neighbor	person.n.01
slave	stranger	person.n.01
friend, companion	**neighbor**	**person.n.01**
friend, companion	stranger	person.n.01
neighbor	**stranger**	**person.n.01**
handkerchief, rag	**towel**	**piece_of_cloth.n.01**
handkerchief, rag	**sail (noun)**	**piece_of_cloth.n.01**
towel	**sail (noun)**	**piece_of_cloth.n.01**
meeting house	temple, church	place_of_worship.n.01
livestock	bat	placental.n.01
navel	place	point.n.02
rain (noun)	snow (noun)	precipitation.n.03
horn	tail	process.n.05
convict (vb)	acquit	pronounce.v.02
age	way, manner	property.n.02
roof	armor (defensive)	protective_covering.n.01
sow	**plant (vb)**	**put.v.01**
bless	curse	raise.v.07
bottom	side	region.n.01
sibling	**cousin**	**relative.n.01**
sibling	ancestors	relative.n.01
cousin	ancestors	relative.n.01
fruit	**flower**	**reproductive_structure.n.01**
gill	lung	respiratory_organ.n.01
kneel	stand	rest.v.01
potato	sweet potato	root_vegetable.n.01
potato	yam	root_vegetable.n.01
sweet potato	yam	root_vegetable.n.01
winter	spring	season.n.02
winter	summer	season.n.02
winter	**autumn**	**season.n.02**
spring	**summer**	**season.n.02**
spring	**autumn**	**season.n.02**
summer	**autumn**	**season.n.02**
eye	ear	sense_organ.n.01
cut	**tear**	**separate.v.02**

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square	circle	shape.n.02
square	line	shape.n.02
circle	line	shape.n.02
cast (metals)	**mold (clay etc)**	**shape.v.02**
cast (metals)	carve	shape.v.02
mold (clay etc)	**carve**	**shape.v.02**
ram	ewe	sheep.n.01
hut	**tent**	**shelter.n.01**
hut	cookhouse	shelter.n.01
tent	cookhouse	shelter.n.01
older sister	younger sister	sister.n.01
spine	heel	skeletal_structure.n.01
mud	**sand**	**soil.n.02**
mud	**clay**	**soil.n.02**
sand	**clay**	**soil.n.02**
food	glass	solid.n.01
husband	**wife**	**spouse.n.01**
husband	married man	spouse.n.01
husband	married woman	spouse.n.01
wife	married man	spouse.n.01
wife	married woman	spouse.n.01
married man	married woman	spouse.n.01
branch	tree trunk	stalk.n.02
bread	potato	starches.n.01
stepson	**stepdaughter**	**stepchild.n.01**
stepfather	**stepmother**	**stepparent.n.01**
spindle	staff, walking stick	stick.n.01
spindle	club	stick.n.01
staff, walking stick	**club**	**stick.n.01**
arch	bridge	structure.n.01
arch	tower	structure.n.01
arch	altar	structure.n.01
bridge	tower	structure.n.01
bridge	altar	structure.n.01
tower	altar	structure.n.01
shelf	yoke	support.n.10
honey	sugar	sweetening.n.01
boar	**sow (2)**	**swine.n.01**
boar	**pig**	**swine.n.01**
sow (2)	**pig**	**swine.n.01**
fever	swelling	symptom.n.01
fever	scar	symptom.n.01
swelling	scar	symptom.n.01

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sing	whisper	talk.v.02
sing	mumble	talk.v.02
sing	stutter, stammer	talk.v.02
whisper	**mumble**	**talk.v.02**
whisper	stutter, stammer	talk.v.02
mumble	**stutter, stammer**	**talk.v.02**
lowtide	hightide	tide.n.01
night	morning	time_period.n.01
night	week	time_period.n.01
night	month	time_period.n.01
night	year	time_period.n.01
night	season	time_period.n.01
morning	week	time_period.n.01
morning	month	time_period.n.01
morning	year	time_period.n.01
morning	season	time_period.n.01
week	month	time_period.n.01
week	year	time_period.n.01
week	season	time_period.n.01
month	year	time_period.n.01
month	**season**	**time_period.n.01**
year	**season**	**time_period.n.01**
day	**hour**	**time_unit.n.01**
hoe	**rake**	**tool.n.01**
grave, tomb	top	topographic_point.n.01
press	pick up	touch.v.01
press	kiss	touch.v.01
pick up	kiss	touch.v.01
rise	fall	travel.v.01
rise	float	travel.v.01
rise	swim	travel.v.01
rise	**fly (vb)**	**travel.v.01**
rise	creep, crawl	travel.v.01
rise	walk	travel.v.01
rise	go up	travel.v.01
rise	go down	travel.v.01
rise	follow	travel.v.01
rise	pursue	travel.v.01
rise	**ride**	**travel.v.01**
rise	retreat	travel.v.01
fall	float	travel.v.01
fall	swim	travel.v.01
fall	**fly (vb)**	**travel.v.01**

Continued on next page

fall	creep, crawl	travel.v.01
fall	walk	travel.v.01
fall	go up	travel.v.01
fall	go down	travel.v.01
fall	follow	travel.v.01
fall	pursue	travel.v.01
fall	ride	travel.v.01
fall	retreat	travel.v.01
float	**swim**	**travel.v.01**
float	**fly (vb)**	**travel.v.01**
float	**creep, crawl**	**travel.v.01**
float	**walk**	**travel.v.01**
float	go up	travel.v.01
float	go down	travel.v.01
float	follow	travel.v.01
float	pursue	travel.v.01
float	**ride**	**travel.v.01**
float	retreat	travel.v.01
swim	**fly (vb)**	**travel.v.01**
swim	**creep, crawl**	**travel.v.01**
swim	**walk**	**travel.v.01**
swim	go up	travel.v.01
swim	go down	travel.v.01
swim	follow	travel.v.01
swim	pursue	travel.v.01
swim	ride	travel.v.01
swim	retreat	travel.v.01
fly (vb)	creep, crawl	travel.v.01
fly (vb)	**walk**	**travel.v.01**
fly (vb)	go up	travel.v.01
fly (vb)	go down	travel.v.01
fly (vb)	follow	travel.v.01
fly (vb)	pursue	travel.v.01
fly (vb)	ride	travel.v.01
fly (vb)	retreat	travel.v.01
creep, crawl	**walk**	**travel.v.01**
creep, crawl	go up	travel.v.01
creep, crawl	go down	travel.v.01
creep, crawl	follow	travel.v.01
creep, crawl	pursue	travel.v.01
creep, crawl	ride	travel.v.01
creep, crawl	retreat	travel.v.01
walk	go up	travel.v.01

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walk	go down	travel.v.01
walk	**follow**	**travel.v.01**
walk	pursue	travel.v.01
walk	**ride**	**travel.v.01**
walk	retreat	travel.v.01
go up	go down	travel.v.01
go up	follow	travel.v.01
go up	pursue	travel.v.01
go up	ride	travel.v.01
go up	retreat	travel.v.01
go down	follow	travel.v.01
go down	pursue	travel.v.01
go down	ride	travel.v.01
go down	retreat	travel.v.01
follow	**pursue**	**travel.v.01**
follow	**ride**	**travel.v.01**
follow	retreat	travel.v.01
pursue	ride	travel.v.01
pursue	retreat	travel.v.01
ride	retreat	travel.v.01
oak	beech	tree.n.01
oak	birch	tree.n.01
oak	palm tree	tree.n.01
beech	birch	tree.n.01
beech	palm tree	tree.n.01
birch	palm tree	tree.n.01
untie	spread out	undo.v.01
groan	**howl**	**utter.v.02**
ship	**boat**	**vessel.n.02**
pot, cooking vessel	bowl	vessel.n.03
pot, cooking vessel	pitcher, jug	vessel.n.03
pot, cooking vessel	mortar (2)	vessel.n.03
pot, cooking vessel	mortar	vessel.n.03
bowl	**pitcher, jug**	**vessel.n.03**
bowl	mortar (2)	vessel.n.03
bowl	mortar	vessel.n.03
pitcher, jug	mortar (2)	vessel.n.03
pitcher, jug	mortar	vessel.n.03
mortar (2)	**mortar**	**vessel.n.03**
beeswax	earwax	wax.n.01
road	**path**	**way.n.06**
sling	**bow**	**weapon.n.01**
sling	spear	weapon.n.01

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sling	sword	weapon.n.01
sling	gun, cannon	weapon.n.01
bow	spear	weapon.n.01
bow	sword	weapon.n.01
bow	**gun, cannon**	**weapon.n.01**
spear	**sword**	**weapon.n.01**
spear	gun, cannon	weapon.n.01
sword	gun, cannon	weapon.n.01
Monday	Tuesday	weekday.n.01
Monday	Wednesday	weekday.n.01
Monday	Thursday	weekday.n.01
Monday	Friday	weekday.n.01
Monday	Saturday	weekday.n.01
Tuesday	Wednesday	weekday.n.01
Tuesday	Thursday	weekday.n.01
Tuesday	Friday	weekday.n.01
Tuesday	Saturday	weekday.n.01
Wednesday	Thursday	weekday.n.01
Wednesday	Friday	weekday.n.01
Wednesday	Saturday	weekday.n.01
Thursday	Friday	weekday.n.01
Thursday	Saturday	weekday.n.01
Friday	Saturday	weekday.n.01
young woman (adolescent)	wife	woman.n.01
young woman (adolescent)	married woman	woman.n.01
young woman (adolescent)	old woman	woman.n.01
young woman (adolescent)	widow	woman.n.01
young woman (adolescent)	prostitute	woman.n.01
wife	married woman	woman.n.01
wife	old woman	woman.n.01
wife	**widow**	**woman.n.01**
wife	prostitute	woman.n.01
married woman	old woman	woman.n.01
married woman	widow	woman.n.01
married woman	prostitute	woman.n.01
old woman	widow	woman.n.01
old woman	prostitute	woman.n.01
widow	**prostitute**	**woman.n.01**
tree (cf 08.600)	**tree**	**woody_plant.n.01**
calf	lamb	young_mammal.n.01

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