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Ass 3 NLP report

1) Summarize statistics:

a. Thresholds: at the top of the file we have the function words list, we used this list when computing the window words and we ignored them, actually the as much as the code concerns these words does not exist in the sentence. Another threshold we decided to do is to not collect Data that relate to function words, which decreased the running time by 70% (from 20 minutes total running time to 6 minutes).

b. Number of words which passed the 75-frequency threshold: 10057 words

c. Number of features considered in our computation for each co-occurrence type: 100 (can be seen when we do the efficient algorithm, in the first for loop:

```
for att in u_att_counter_tuple[u].most_common(100):
```

2)Qualitive conclusion:

Full list in the end of the report Appendix - Top 20 similars co-occurrence (top20.csv and top20.txt). we have been asked to add the txt file, so we added it even though it's easier to read the csv file.

Comparative characteristics between there types of similarity: a good example to look at is the word bomb, the window type gave us words like bombing, explosion, explode, the sentence based features data gives us words like damage, evacuate, destroy and the dependency based data gives us rocket, weapon, missile.

You can see that the words of the window type are words that are closer in relation to bomb line explode (the bomb exploded etc.…) and when we look at the sentence its words like evacuate and destroy which are related to bomb but in pretty far relation, and when we see the dependency based data we get words that are types of bombs (missile, rocket) or describe bomb (weapon, device)

The main characteristics we found was that for words in the same sentence the relation is clear but not always the first thing we would have thought of when we hear that exact word (another example is for bomb the word Luftwaffe which is a German aircraft from WWII that terrorized soldiers by doing dive bombing, as we said the relation is there but pretty far). As for window-based data, we can see that it is easier to see the connection between the original word and the closest words we get (in table we get periotic and tennis which are kinds of tables), and last for the dependency connections we get words of object that bejhave the same like the first word (like in horse we can see motorcycle and bicycle which are ridable objects like horse).

3) Top contexts attributes:

Full list in the end of the report, (Top 20 1st order similar co-occurrence
(top20_1st_order.csv)).

As we can see in the lists, it's pretty easy to notice the difference between the 1st order
similarities and 2nd order similarities, take the word car as an example, in the 1st order
similarity we see words like touring, racing, armored which are features of car (touring car,
racing car, armored car etc.…) but when we look at the 2nd order similarity we see words like
truck, vehicle, motorcycle which are more related to car by being in the same category as car
by being a transport machine just like car.

It's even more noticeable when looking at the word hospital, 1st order top word is psychiatric
and when we look at 2nd order we see that the first word is clinic which is almost the same as
hospital.

4) manual judgments:

MAP:

Window		Sentence		Dependency	
Semantic	Topical	Semantic	Topical	Semantic	Topical
0.55	0.9	0.5	1	0.65	0.85

Full lists at the end of the report (top20_car_semantically/topical,
top20_piano_semantically/topical) that's the judgment lists for the similarity output for the
co-occurrence mission):

You can see that the results are as expected, the highest score in the semantical (words that
behave the same as the original word) type we got in the dependency co-occurrence type, the
best score for the topical (which is reasonable because it's words that had the same words
around them like the original word) we have at the sentence type and best of both worlds we
have when we look at the window type.

The main conclusion we see here is you can use different features to get similar words
according to your needs, if you need words that have better semantic relation to your word
you might be better using dependency feature collection, but if you need words that have
topical connection to your word its better for you to choose sentence based data collection, if
you need both you can use window based collection.

5) Implementation brief description:

a. PMI: we used the basic PMI estimation technique using the counters to estimate probability and we didn't save a matrix of the PMI values, we calculated the values in place in the algorithm, for each of the co-occurrence types we had different PMI function (log_PMI_u_att_<windows/words/tuple>) which used different counters to count the attributes.

b. Implementation of the efficient algorithm: almost exactly like the pseudo-code we saw in class with a minor improvement that we do not save the matrix, we use counters to mimic the rows and columns in the matrix, and every time we calculate the needed PMI value to save space, also we compute the PMi for the word every row only once.

At the end we sort the lists we need to print and return the top 20 words and contexts for each word.

After we ignored completely the function words the running time became reasonable so we didn't feel there is need for another improvement (about 6 minutes for the whole corpus)

The efficient function names are: most_similar_efficient_att_<tuple/words/windows>

The function words list is at the top of the code, named function_words.

When counting words to the unigram counter you can see there is a list, we filter the words that didn't pass the 75 words threshold, plus we everyu time in the main loop check whether the word is in the words_set(words seen above 75 times) and if its not in the function words set.

6) word2vec results:

Python related files are:

i.   vec_similarity.py – the running file with the algorithm for comparison and computing cosine distance for each vector after reading vectors.

ii.   vecs_asarray.py – instead of searching the vectors of each word we already got them from the files and saved them in this file to save time in each run.

2)Qualitive conclusion(word2vec):

As in the co-occurrence code we can see almos the same behavior, the words in the dependency were words that serve the same role in the sentence as the original goal ("I drive my car" can be "I drive my lory") and when it comes to bow5 we see more of words that relate to the original word but not necessarily can replace it in the sentence.

Full list an the appendinx at the end under the title Top20_word2vec(top20_word2vec.txt top20_word2vec.csv)

3) Top contexts attributes(word2vec):

For word2vec we found that its harder to see the difference between 1st order and 2nd order, as we see in the list in bow5 the word mid-engine appear in both lists, its easier to see why its in the 1st order (mid-engine car).

Like in the co-occurrence explanation we see that we get in the contexts words that relate to the main word by modifying it or addressing it, and when we look at the 2nd similarity type we get words that have the same behavior in the sentence like the original word.

4) manual judgments:

When it comes to word2vec we had much better results in the manual judgment then we had in the co-occurrence judgment

MAP:

Window		Dependency	
Semantic	Topical	Semantic	Topical
0.8	1	0.975	1

As we see in this word2vec test we get the same results, dependency get better semantic score but this time it doesn't get worse when it comes to topical score.

One thing to keep in mind about the scores of word2vec and co-occurrence, the word2vec vectors are the product of learning the full Wikipedia corpus, our output is only after learning a sample from the corpus, and that's why the scores we got in co-occurrence judgement are lower overall then the scores we get in the word2vec judgement.

Appendix:

Judgment lists:

Top20_car_semantically(top20_car_semantic.csv):

dependency		sentence		window	
vehicle	1	toyota	1	truck	1
truck	1	driver	0	vehicle	1
motorcycle	1	chassis	0	motorcycle	1
automobile	1	racing	0	motor	0
train	1	chevrolet	1	racing	0
bus	1	nascar	1	automobile	1
boat	1	ferrari	1	bicycle	1
motor	0	bmw	1	driver	0
aircraft	1	truck	1	bus	1
bicycle	1	axle	0	rail	0
engine	0	motor	0	boat	1
racing	0	gt	0	train	1
driver	0	v8	0	race	0
locomotive	1	wheel	0	ford	1
horse	1	f1	1	bike	1
ford	1	formula	0	crash	0
van	1	lap	0	auto	1
formula	0	ford	1	freight	1
ship	0	porsche	1	passenger	0
auto	1	auto	1	formula	1

Top20_car_topical(top20_car_topically.csv):

dependency		sentence		window	
vehicle	1	toyota	1	truck	1
truck	1	driver	1	vehicle	1
motorcycle	1	chassis	1	motorcycle	1
automobile	1	racing	1	motor	1
train	1	chevrolet	1	racing	1
bus	1	nascar	1	automobile	1
boat	1	ferrari	1	bicycle	1
motor	1	bmw	1	driver	1
aircraft	1	truck	1	bus	1
bicycle	1	axle	1	rail	0
engine	1	motor	1	boat	1
racing	1	gt	1	train	1
driver	1	v8	1	race	1
locomotive	0	wheel	1	ford	1
horse	0	f1	1	bike	1
ford	1	formula	1	crash	1
van	1	lap	1	auto	1
formula	1	ford	1	freight	0

ship	0	porsche	1	passenger	1
auto	1	auto	1	formula	1

top20_piano_semantic(top20_piano_semantic.csv):

dependency		sentence		window	
violin	1	violin	1	violin	1
cello	1	cello	1	cello	1
flute	1	clarinet	1	clarinet	1
guitar	1	flute	1	solo	0
clarinet	1	concerto	0	sonata	0
bass	0	sonata	0	flute	1
viola	1	trumpet	1	concerto	0
keyboard	0	viola	1	op	0
horn	0	percussion	0	keyboard	0
drum	1	saxophone	1	string	0
organ	1	op	0	bass	0
percussion	0	orchestra	0	trumpet	1
orchestra	0	harp	1	guitar	1
instrument	1	soloist	0	saxophone	1
trumpet	1	quartet	0	viola	1
music	0	ensemble	0	organ	1
saxophone	1	tenor	1	horn	0
harp	1	instrument	1	lesson	0
solo	0	bass	0	classical	0
choir	0	soprano	0	recital	0

top20_piano_topically(top20_piano_topically.csv):

dependency		sentence		window	
violin	1	violin	1	violin	1
cello	1	cello	1	cello	1
flute	1	clarinet	1	clarinet	1
guitar	1	flute	1	solo	1
clarinet	1	concerto	1	sonata	1
bass	1	sonata	1	flute	1
viola	1	trumpet	1	concerto	1
keyboard	0	viola	1	op	1
horn	0	percussion	1	keyboard	0
drum	1	saxophone	1	string	1
organ	1	op	1	bass	1
percussion	1	orchestra	1	trumpet	1
orchestra	1	harp	1	guitar	1
instrument	1	soloist	1	saxophone	1
trumpet	1	quartet	1	viola	1
music	1	ensemble	1	organ	1

saxophone	1	tenor	1	horn	0
harp	1	instrument	1	lesson	1
solo	1	bass	1	classical	1
choir	0	soprano	1	recital	1

word2vec_top20_car_semantic.csv:

dependency		bow5	
truck	1	cars	1
suv	1	truck	1
vehicle	1	automobile	1
minivan	1	vehicle	1
cars	1	motorbike	1
speedboat	1	motorcycle	1
racecar	1	driver	0
automobile	1	minivan	1
motorcar	1	suv	1
jeep	1	lorry	1
limousine	1	motorcar	1
minibus	1	mid-engined	0
lorry	1	limousine	1
limo	1	front-engined	0
motorcycle	1	moped	1
bike	1	motorhome	1
motorhome	1	mercedes-benz	0
taxicab	1	bike	1
roadster	1	rear-engined	0
wagon	0	three-wheeled	0

word2vec_top20_car_topical.csv:

dependency		bow5	
truck	1	cars	1
suv	1	truck	1
vehicle	1	automobile	1
minivan	1	vehicle	1
cars	1	motorbike	1
speedboat	1	motorcycle	1
racecar	1	driver	1
automobile	1	minivan	1
motorcar	1	suv	1
jeep	1	lorry	1
limousine	1	motorcar	1
minibus	1	mid-engined	1
lorry	1	limousine	1
limo	1	front-engined	1
motorcycle	1	moped	1
bike	1	motorhome	1

motorhome	1	mercedes-benz	1
taxicab	1	bike	1
roadster	1	rear-engined	1
wagon	1	three-wheeled	1

word2vec_top20_piano_semantic.csv:

dependency		bow5	
violin	1	violin	1
cello	1	cello	1
harpsichord	1	harpsichord	1
saxophone	1	clarinet	1
clarinet	1	viola	1
guitar	1	flute	1
trombone	1	bassoon	1
mandolin	1	violoncello	1
vibraphone	1	oboe	1
marimba	1	concerto	1
accordion	1	saxophone	1
pianoforte	1	accordion	1
bassoon	1	harp	1
fortepiano	1	trombone	1
violoncello	1	sonatas	0
trumpet	1	trumpet	1
harmonica	1	mandolin	1
clavinet	1	pianoforte	1
clavichord	1	vibraphone	1
euphonium	1	concertos	0

word2vec_top20_piano_topical.csv:

dependency		bow5	
violin	1	violin	1
cello	1	cello	1
harpsichord	1	harpsichord	1
saxophone	1	clarinet	1
clarinet	1	viola	1
guitar	1	flute	1
trombone	1	bassoon	1
mandolin	1	violoncello	1
vibraphone	1	oboe	1
marimba	1	concerto	1
accordion	1	saxophone	1
pianoforte	1	accordion	1
bassoon	1	harp	1
fortepiano	1	trombone	1
violoncello	1	sonatas	1

trumpet	1	trumpet	1
harmonica	1	mandolin	1
clavinet	1	pianoforte	1
clavichord	1	vibraphone	1
euphonium	1	concertos	1

Output lists 1ˢᵗ order and 2ⁿᵈ order:

Top 20 similars co-occurrence (top20.csv and top20.txt):

dependency	sentence	window	word
			car
vehicle	toyota	truck	
truck	driver	vehicle	
motorcycle	chassis	motorcycle	
automobile	racing	motor	
train	chevrolet	racing	
bus	nascar	automobile	
boat	ferrari	bicycle	
motor	bmw	driver	
aircraft	truck	bus	
bicycle	axle	rail	
engine	motor	boat	
racing	gt	train	
driver	v8	race	
locomotive	wheel	ford	
horse	f1	bike	
ford	formula	crash	
van	lap	auto	
formula	ford	freight	
ship	porsche	passenger	
auto	auto	formula	
			bus
rail	commuter	commuter	
train	transit	transit	
tram	rail	rail	
ferry	tram	tram	
car	passenger	passenger	
operator	metro	operator	
taxi	interchange	ferry	
road	terminal	transport	
transit	freight	metro	
railway	amtrak	interchange	
vehicle	subway	terminal	
passenger	terminus	freight	
line	transport	train	
bicycle	tramway	taxi	

metro	route	shuttle	
route	taxi	connect	
highway	transportation	route	
railroad	ferry	truck	
freight	depot	express	
subway	hub	rout	
			hospital
clinic	clinic	clinic	
home	medical	psychiatric	
school	nursing	medical	
facility	psychiatric	nh	
hotel	surgical	care	
library	healthcare	nursing	
center	rehabilitation	facility	
camp	surgery	patient	
museum	psychiatry	hopkins	
ward	care	charity	
prison	health	bed	
college	patient	health	
institution	psychiatrist	memorial	
airport	nh	mercy	
office	acute	college	
store	medicine	trust	
centre	clinical	presbyterian	
theatre	dental	institution	
house	diagnosis	mental	
laboratory	pharmacy	teaching	
			hotel
restaurant	restaurant	luxury	
store	inn	plaza	
resort	casino	casino	
building	resort	resort	
shop	plaza	near	
inn	tourist	restaurant	
theater	luxury	dining	
house	shop	shopping	
palace	dining	windsor	
apartment	renovate	chain	
park	attraction	room	
factory	accommodation	nearby	
theatre	retail	inn	
station	tavern	riverside	
casino	apartment	hilton	
home	mall	apartment	
tower	shopping	savoy	
facility	cater	palace	

residence	pub	grand	
hall	demolish	theatre	
			gun
cannon	launcher	cannon	
artillery	anti-aircraft	anti-aircraft	
pistol	turret	artillery	
rifle	ammunition	fire	
weapon	cannon	machine	
mortar	armament	tank	
shotgun	rifle	rifle	
fire	mortar	heavy	
battery	grenade	mortar	
camera	artillery	battery	
engine	projectile	armament	
turret	battery	mm	
tube	tank	enemy	
rocket	weapon	turret	
unit	fire	weapon	
ammunition	mm	ammunition	
tank	armored	gunner	
vehicle	firing	radar	
ship	battleship	laser	
machine	gunner	aa	
			bomb
bombing	explode	bombing	
torpedo	bombing	explosion	
rocket	luftwaffe	explode	
attack	bomber	nuclear	
weapon	explosive	bomber	
shell	explosion	blast	
fire	raid	raid	
device	injure	attack	
missile	blast	disposal	
explosion	damage	tank	
car	tanker	atomic	
strike	evacuate	destroy	
tank	destroy	aircraft	
explosive	airfield	plane	
grenade	ira	fighter	
earthquake	grenade	fly	
bomber	plane	luftwaffe	
storm	aircraft	during	
aircraft	sink	allied	
crash	allied	explosive	
			horse
dog	thoroughbred	thoroughbred	
motorcycle	jockey	racing	

bicycle	pony	brigade	
animal	racecourse	regiment	
car	mounted	cavalry	
bike	breeder	pony	
pony	ride	artillery	
racing	rider	breed	
bull	rid	motorcycle	
volunteer	sire	harness	
thoroughbred	racing	race	
team	stake	stable	
truck	handicap	ride	
goat	breed	infantry	
woman	cavalry	rider	
cattle	stud	camel	
man	camel	guard	
race	saddle	bike	
athlete	riding	cattle	
dragon	mare	jockey	
			fox
abc	nbc	nbc	
nbc	cbs	abc	
cbs	abc	cbs	
television	espn	news	
bbc	affiliation	affiliate	
network	programming	network	
espn	cbc	tv	
tv	newscast	television	
sport	affiliate	cbc	
channel	broadcasting	programming	
radio	channel	broadcasting	
cbc	broadcast	channel	
cable	cnn	radio	
news	television	sport	
itv	pb	espn	
smith	daytime	pb	
shaw	network	cnn	
cnn	hbo	matthew	
cox	news	anchor	
entertainment	weekday	drama	
			table
list	heading	tennis	
column	html	periodic	
page	picnic	picnic	
section	volleyball	below	
template	skiing	file	

category	header	etc	
screen	row	badminton	
bottom	badminton	html	
discussion	excel	summarize	
room	infobox	database	
diagram	softball	pdf	
infobox	handball	update	
article	gymnastics	rotary	
bench	xml	swim	
row	subscription	ten	
entry	bottom	altar	
image	playground	dinner	
window	database	water	
box	mediawiki	following	
magazine	bracket	chess	
			bowl
super	batsman	super	
cup	bowler	bowler	
championship	steelers	mvp	
league	right-handed	quiz	
tournament	mvp	pro	
game	wicket	rose	
playoff	playoff	tournament	
football	inning	all-american	
club	consecutive	lawn	
team	nfl	consecutive	
trophy	49ers	golden	
season	redskin	compass	
final	packer	playoff	
conference	afc	orange	
match	super	victory	
division	berth	ball	
nfl	quarterback	bermuda	
wrestling	bowling	classic	
baseball	all-time	cotton	
square	cowboy	championship	
			guitar
drum	bass	bass	
bass	percussion	piano	
piano	acoustic	drum	
keyboard	drum	keyboard	
vocal	vocal	vocal	
flute	keyboard	acoustic	
instrument	saxophone	solo	
violin	flute	violin	
trumpet	piano	instrument	

cello	guitarist	trumpet	
saxophone	rhythm	pedal	
organ	violin	playing	
clarinet	instrument	saxophone	
string	bassist	intro	
horn	backing	flute	
solo	trumpet	jazz	
music	cello	rhythm	
tenor	instrumentation	tenor	
percussion	synthesizer	electric	
orchestra	clarinet	string	
			piano
violin	violin	violin	
cello	cello	cello	
flute	clarinet	clarinet	
guitar	flute	solo	
clarinet	concerto	sonata	
bass	sonata	flute	
viola	trumpet	concerto	
keyboard	viola	op	
horn	percussion	keyboard	
drum	saxophone	string	
organ	op	bass	
percussion	orchestra	trumpet	
orchestra	harp	guitar	
instrument	soloist	saxophone	
trumpet	quartet	viola	
music	ensemble	organ	
saxophone	tenor	horn	
harp	instrument	lesson	
solo	bass	classical	
choir	soprano	recital	

Top 20 1st order similar co-occurrence (top20 1st_order.csv):

dependency	sentence	window	word
			car
('dealership'; 'compmod'; 'TO-ME')	racing	touring	
('parking'; 'compmod'; 'TO-ME')	driver	armoured	
('wash'; 'compmod'; 'TO-ME')	lap	accident	
('accident'; 'compmod'; 'TO-ME')	motor	armored	
('truck'; 'conj'; 'FROM-ME')	accident	rental	
('armoured'; 'amod'; 'FROM-ME')	truck	luxury	
('concept'; 'compmod'; 'FROM-ME')	formula	crash	
('race'; 'dobj'; 'TO-ME')	crash	parking	
('crash'; 'compmod'; 'TO-ME')	ford	wash	
('bomb'; 'compmod'; 'TO-ME')	race	racing	

('hit'; 'adpobj'; 'TO-ME'; 'adpmod'; 'by')	drive	funny	
('armored'; 'amod'; 'FROM-ME')	wheel	cable	
('ferry'; 'compmod'; 'TO-ME')	passenger	sprint	
('race'; 'amod'; 'FROM-ME')	vehicle	freight	
('drive'; 'dobj'; 'TO-ME')	stock	dealer	
('formula'; 'compmod'; 'FROM-ME')	engine	stock	
('drive'; 'partmod'; 'FROM-ME')	sport	motor	
('racing'; 'compmod'; 'TO-ME')	speed	ferry	
('luxury'; 'compmod'; 'FROM-ME')	championship	race	
('cable'; 'compmod'; 'FROM-ME')	front	driver	
			bus
('tram'; 'conj'; 'TO-ME')	transit	interchange	
('‰ireann'; 'compmod'; 'TO-ME')	interchange	rout	
('subway'; 'conj'; 'TO-ME')	terminal	shuttle	
('stop'; 'compmod'; 'TO-ME')	taxi	terminal	
('rout'; 'nsubj'; 'TO-ME')	depot	depot	
('serial'; 'compmod'; 'FROM-ME')	route	route	
('terminus'; 'compmod'; 'TO-ME')	metro	commuter	
('route'; 'nsubj'; 'TO-ME')	transport	operator	
('interchange'; 'compmod'; 'TO-ME')	terminus	transit	
('accessible'; 'adpobj'; 'TO-ME'; 'adpmod'; 'by')	passenger	shelter	
('rail'; 'conj'; 'FROM-ME')	truck	stop	
('shelter'; 'compmod'; 'TO-ME')	operator	service	
('route'; 'compmod'; 'TO-ME')	stop	serial	
('terminal'; 'compmod'; 'TO-ME')	transportation	hybrid	
('rail'; 'conj'; 'TO-ME')	service	parking	
('stand'; 'compmod'; 'TO-ME')	operate	rapid	
('passenger'; 'compmod'; 'TO-ME')	connect	terminus	
('depot'; 'compmod'; 'TO-ME')	rail	station	
('transit'; 'compmod'; 'TO-ME')	station	motor	
('board'; 'dobj'; 'TO-ME')	airport	driver	
			hospital
('doctor'; 'adpobj'; 'TO-ME'; 'adpmod'; 'at')	psychiatric	psychiatric	
('rush'; 'adpobj'; 'TO-ME'; 'adpmod'; 'to')	clinic	bed	
('teaching'; 'amod'; 'FROM-ME')	bed	hopkins	
('psychiatric'; 'amod'; 'FROM-ME')	medical	nh	
('bed'; 'compmod'; 'TO-ME')	surgery	mercy	
('stay'; 'compmod'; 'TO-ME')	patient	teaching	
('hopkins'; 'compmod'; 'FROM-ME')	bombay	acute	
('teaching'; 'compmod'; 'FROM-ME')	care	mental	
('rush'; 'adpobj'; 'TO-ME')	teaching	memorial	
('transport'; 'adpobj'; 'TO-ME'; 'adpmod'; 'to')	cancer	presbyterian	
('take'; 'adpobj'; 'TO-ME'; 'adpmod'; 'to')	health	admission	
('patient'; 'adpobj'; 'TO-ME')	medicine	rush	
('memorial'; 'compmod'; 'FROM-ME')	emergency	general	
('admit'; 'adpobj'; 'TO-ME'; 'adpmod'; 'to')	doctor	christ	

('die'; 'adpobj'; 'TO-ME'; 'adpmod'; 'at')	dr	recover	
('eye'; 'compmod'; 'FROM-ME')	memorial	charity	
('general'; 'compmod'; 'FROM-ME')	facility	massachusetts	
('visit'; 'adpobj'; 'TO-ME'; 'adpmod'; 'in')	trust	veteran	
('doctor'; 'adpobj'; 'TO-ME')	treatment	naval	
('massachusetts'; 'compmod'; 'FROM-ME')	tamil	nearby	
			hotel
('casino'; 'conj'; 'FROM-ME')	resort	hilton	
('lobby'; 'compmod'; 'TO-ME')	luxury	luxury	
('hilton'; 'compmod'; 'FROM-ME')	casino	savoy	
('plaza'; 'compmod'; 'FROM-ME')	plaza	plaza	
('resort'; 'conj'; 'FROM-ME')	restaurant	dining	
('savoy'; 'compmod'; 'FROM-ME')	inn	lobby	
('neutral'; 'compmod'; 'FROM-ME')	room	paramount	
('luxury'; 'compmod'; 'FROM-ME')	tourist	casino	
('restaurant'; 'conj'; 'FROM-ME')	chain	room	
('resort'; 'compmod'; 'FROM-ME')	guest	riverside	
('stay'; 'adpobj'; 'TO-ME'; 'adpmod'; 'at')	shop	chain	
('palace'; 'compmod'; 'FROM-ME')	palace	windsor	
('room'; 'compmod'; 'TO-ME')	purchase	resort	
('convert'; 'adpobj'; 'TO-ME'; 'adpmod'; 'into')	stay	grand	
('milk'; 'compmod'; 'FROM-ME')	tower	palace	
('chain'; 'compmod'; 'TO-ME')	owner	expensive	
('restaurant'; 'adpobj'; 'TO-ME')	bar	midland	
('chain'; 'adpobj'; 'TO-ME'; 'adpmod'; 'of')	grand	milk	
('shop'; 'conj'; 'TO-ME')	historic	ace	
('purchase'; 'dobj'; 'TO-ME')	spring	nearby	
			gun
('navarone'; 'adpobj'; 'FROM-ME')	anti-aircraft	anti-aircraft	
('anti-aircraft'; 'compmod'; 'FROM-ME')	turret	machine	
('emplacement'; 'compmod'; 'TO-ME')	armament	mm	
('rifle'; 'amod'; 'FROM-ME')	machine	mounted	
('machine'; 'compmod'; 'FROM-ME')	ammunition	barrel	
('battery'; 'adpobj'; 'TO-ME'; 'adpmod'; 'of')	barrel	mk	
('barrel'; 'compmod'; 'TO-ME')	rifle	deck	
('arm'; 'adpobj'; 'TO-ME'; 'adpmod'; 'with')	battery	turret	
('aim'; 'dobj'; 'TO-ME')	artillery	bunker	
('deck'; 'compmod'; 'FROM-ME')	deck	n	
('mounted'; 'amod'; 'FROM-ME')	fire	armstrong	
('ammunition'; 'conj'; 'FROM-ME')	mount	heavy	
('man'; 'dobj'; 'TO-ME')	weapon	artillery	
('mm'; 'compmod'; 'FROM-ME')	tank	rifle	
('mortar'; 'conj'; 'FROM-ME')	shot	shield	
('rifle'; 'conj'; 'TO-ME')	assault	jam	
('shoot'; 'adpobj'; 'TO-ME'; 'adpmod'; 'with')	rose	lewis	
('mount'; 'nsubjpass'; 'TO-ME')	heavy	nest	
('jump'; 'dobj'; 'TO-ME')	shoot	battery	

('battery'; 'adpobj'; 'TO-ME')	arm	jump	
			bomb
('aimer'; 'compmod'; 'TO-ME')	explode	atomic	
('detonate'; 'nsubjpass'; 'TO-ME')	luftwaffe	explode	
('detonate'; 'dobj'; 'TO-ME')	atomic	disposal	
('pipe'; 'amod'; 'FROM-ME')	ira	petrol	
('explode'; 'nsubj'; 'TO-ME')	bombing	hydrogen	
('luftwaffe'; 'nsubj'; 'FROM-ME')	explosion	parcel	
('explodes'; 'compmod'; 'TO-ME')	explosive	luftwaffe	
('defuse'; 'dobj'; 'TO-ME')	injure	ira	
('explode'; 'compmod'; 'TO-ME')	bomber	blast	
('aircraft'; 'adpobj'; 'FROM-ME'; 'adpmod'; 'by')	hydrogen	explosion	
('disposal'; 'compmod'; 'TO-ME')	raid	raid	
('blast'; 'compmod'; 'TO-ME')	nuclear	premature	
('plant'; 'partmod'; 'FROM-ME')	drop	neutron	
('explosion'; 'compmod'; 'TO-ME')	sink	pipe	
('raid'; 'dobj'; 'FROM-ME')	target	bounce	
('atomic'; 'amod'; 'FROM-ME')	aircraft	suicide	
('hydrogen'; 'compmod'; 'FROM-ME')	kill	explosive	
('cluster'; 'compmod'; 'FROM-ME')	damage	nuclear	
('wave'; 'adpobj'; 'FROM-ME'; 'adpmod'; 'in')	plane	conventional	
('plant'; 'dobj'; 'TO-ME')	destroy	nato	
			horse
('pony'; 'conj'; 'FROM-ME')	thoroughbred	thoroughbred	
('mule'; 'conj'; 'FROM-ME')	mounted	trojan	
('harness'; 'compmod'; 'FROM-ME')	jockey	harness	
('trojan'; 'compmod'; 'FROM-ME')	rid	rid	
('ride'; 'dobj'; 'TO-ME')	trailer	crazy	
('wagon'; 'conj'; 'FROM-ME')	rider	racing	
('crazy'; 'compmod'; 'FROM-ME')	riding	riding	
('rider'; 'conj'; 'FROM-ME')	racing	drawn	
('thoroughbred'; 'compmod'; 'FROM-ME')	breed	arabian	
('rid'; 'dobj'; 'TO-ME')	cattle	cattle	
('bull'; 'conj'; 'TO-ME')	bombay	ride	
('riding'; 'compmod'; 'TO-ME')	ride	artillery	
('racing'; 'compmod'; 'TO-ME')	stake	wild	
('rid'; 'partmod'; 'FROM-ME')	cavalry	breed	
('race'; 'partmod'; 'FROM-ME')	regiment	race	
('troop'; 'adpobj'; 'TO-ME'; 'adpmod'; 'of')	artillery	rider	
('man'; 'adpobj'; 'TO-ME'; 'adpmod'; 'on')	brigade	brigade	
('fall'; 'adpobj'; 'TO-ME'; 'adpmod'; 'from')	race	dark	
('age'; 'partmod'; 'FROM-ME')	wild	trainer	
('race'; 'adpobj'; 'TO-ME'; 'adpmod'; 'for')	trail	shoe	
			fox
('sauk'; 'conj'; 'TO-ME')	hound	sac	
('hound'; 'conj'; 'FROM-ME')	affiliation	20th	

('searchlight'; 'compmod'; 'TO-ME')	cbs	hunting	
('footy'; 'compmod'; 'TO-ME')	nbc	news	
('mulder'; 'compmod'; 'TO-ME')	abc	twentieth	
('hare'; 'conj'; 'TO-ME')	affiliate	affiliate	
('abc'; 'conj'; 'TO-ME')	sport	sport	
('terrier'; 'compmod'; 'TO-ME')	news	reservation	
('hunting'; 'compmod'; 'TO-ME')	programming	matthew	
('televise'; 'adpobj'; 'TO-ME'; 'adpmod'; 'on')	channel	64	
('ohio'; 'compmod'; 'TO-ME')	20th	kid	
('cat'; 'conj'; 'FROM-ME')	network	gray	
('net'; 'compmod'; 'TO-ME')	kid	broadcasting	
('twentieth'; 'compmod'; 'FROM-ME')	soccer	programming	
('kit'; 'compmod'; 'FROM-ME')	switch	abc	
('televise'; 'adpobj'; 'TO-ME')	entertainment	network	
('affiliation'; 'compmod'; 'TO-ME')	morning	kit	
('gray'; 'amod'; 'FROM-ME')	broadcast	nbc	
('news'; 'compmod'; 'TO-ME')	television	soccer	
('affiliate'; 'compmod'; 'TO-ME')	tv	century	
			table
('list'; 'adpobj'; 'FROM-ME'; 'adpmod'; 'below')	picnic	picnic	
('carpianum'; 'conj'; 'TO-ME')	tennis	periodic	
('periodic'; 'compmod'; 'FROM-ME')	gospel	tennis	
('following'; 'compmod'; 'FROM-ME')	row	badminton	
('tennis'; 'compmod'; 'TO-ME')	column	rotary	
('picnic'; 'amod'; 'FROM-ME')	database	html	
('picnic'; 'compmod'; 'FROM-ME')	following	following	
('content'; 'adpobj'; 'FROM-ME'; 'adpmod'; 'of')	content	coffee	
('salt'; 'compmod'; 'TO-ME')	template	canon	
('medal'; 'compmod'; 'FROM-ME')	medal	summarize	
('column'; 'adpobj'; 'TO-ME'; 'adpmod'; 'of')	format	breakfast	
('periodic'; 'amod'; 'FROM-ME')	finish	altar	
('truth'; 'compmod'; 'FROM-ME')	element	operating	
('content'; 'adpobj'; 'FROM-ME')	list	salt	
('sit'; 'adpobj'; 'TO-ME'; 'adpmod'; 'at')	contain	database	
('canon'; 'compmod'; 'FROM-ME')	entry	dinner	
('row'; 'adpobj'; 'TO-ME'; 'adpmod'; 'of')	key	mathematical	
('row'; 'adpobj'; 'TO-ME')	code	pool	
('knight'; 'adpobj'; 'TO-ME'; 'adpmod'; 'of')	water	medal	
('column'; 'adpobj'; 'TO-ME')	text	setting	
			bowl
('batsman'; 'rcmod'; 'TO-ME')	right-handed	super	
('xliv'; 'compmod'; 'TO-ME')	super	batsman	
('xlii'; 'compmod'; 'TO-ME')	quiz	quiz	
('xxxiv'; 'compmod'; 'TO-ME')	steelers	pro	
('xliii'; 'compmod'; 'TO-ME')	batsman	rose	
('xxxvi'; 'compmod'; 'TO-ME')	bowler	alley	

('alley'; 'amod'; 'TO-ME')	rose	sugar	
('xl'; 'compmod'; 'TO-ME')	wicket	lawn	
('select'; 'adpobj'; 'TO-ME'; 'adpmod'; 'to')	pro	bermuda	
('pace'; 'dobj'; 'FROM-ME')	sugar	subdivision	
('rose'; 'compmod'; 'FROM-ME')	pace	cotton	
('bermuda'; 'compmod'; 'FROM-ME')	nfl	orange	
('quiz'; 'compmod'; 'FROM-ME')	orange	mvp	
('pro'; 'compmod'; 'FROM-ME')	cotton	dust	
('sugar'; 'compmod'; 'FROM-ME')	inning	compass	
('subdivision'; 'compmod'; 'TO-ME')	touchdown	barrow	
('invitation'; 'adpobj'; 'TO-ME'; 'adpmod'; 'to')	consecutive	bowler	
('super'; 'compmod'; 'FROM-ME')	ball	xiii	
('ball'; 'rcmod'; 'TO-ME')	yard	all-american	
('orange'; 'compmod'; 'FROM-ME')	stadium	toilet	
			guitar
('vocal'; 'appos'; 'TO-ME')	bass	acoustic	
('vocal'; 'appos'; 'FROM-ME')	percussion	bass	
('banjo'; 'conj'; 'TO-ME')	acoustic	rhythm	
('amplifier'; 'conj'; 'FROM-ME')	vocal	electric	
('riff'; 'compmod'; 'TO-ME')	keyboard	amplifier	
('vocal'; 'conj'; 'FROM-ME')	drum	vintage	
('vocal'; 'conj'; 'TO-ME')	amplifier	pedal	
('keyboard'; 'conj'; 'FROM-ME')	saxophone	gibson	
('bass'; 'conj'; 'FROM-ME')	line-up	solo	
('bass'; 'appos'; 'FROM-ME')	rhythm	tenor	
('bass'; 'compmod'; 'FROM-ME')	backing	playing	
('percussion'; 'conj'; 'FROM-ME')	electric	distortion	
('rhythm'; 'compmod'; 'FROM-ME')	gibson	intro	
('solo'; 'compmod'; 'TO-ME')	piano	vocal	
('acoustic'; 'amod'; 'FROM-ME')	violin	chord	
('drum'; 'conj'; 'FROM-ME')	guitarist	hero	
('intro'; 'compmod'; 'TO-ME')	string	rag	
('consist'; 'adpobj'; 'TO-ME'; 'adpmod'; 'on')	solo	flute	
('saxophone'; 'conj'; 'FROM-ME')	instrument	concerto	
('trumpet'; 'conj'; 'FROM-ME')	melody	signature	
			piano
('accordion'; 'compmod'; 'TO-ME')	cello	concerto	
('accompaniment'; 'compmod'; 'TO-ME')	sonata	viola	
('viola'; 'conj'; 'TO-ME')	op	cello	
('concertino'; 'adpobj'; 'TO-ME'; 'adpmod'; 'for')	viola	sonata	
('concertino'; 'adpobj'; 'TO-ME')	concerto	violin	
('trio'; 'adpobj'; 'TO-ME'; 'adpmod'; 'for')	violin	recital	
('harpsichord'; 'conj'; 'TO-ME')	clarinet	clarinet	
('cello'; 'conj'; 'TO-ME')	opus	lesson	
('concerto'; 'compmod'; 'TO-ME')	saxophone	solo	
('violin'; 'conj'; 'TO-ME')	trumpet	opus	

('virtuoso'; 'compmod'; 'TO-ME')	pianist	trio	
('op'; 'conj'; 'FROM-ME')	flute	prepared	
('sonata'; 'compmod'; 'TO-ME')	lesson	beethoven	
('recital'; 'compmod'; 'TO-ME')	trio	trumpet	
('harp'; 'conj'; 'TO-ME')	keyboard	quartet	
('sonata'; 'adpobj'; 'TO-ME'; 'adpmod'; 'for')	guitar	acoustic	
('concerto'; 'adpobj'; 'TO-ME'; 'adpmod'; 'for')	solo	atop	
('clarinet'; 'conj'; 'TO-ME')	orchestra	saxophone	
('violin'; 'conj'; 'FROM-ME')	organ	duet	
('quintet'; 'compmod'; 'TO-ME')	drum	suite	

Top20 word2vec(top20_word2vec.txt top20_word2vec.csv):

dependency	bow5	word
		car
truck	cars	
suv	truck	
vehicle	automobile	
minivan	vehicle	
cars	motorbike	
speedboat	motorcycle	
racecar	driver	
automobile	minivan	
motorcar	suv	
jeep	lorry	
limousine	motorcar	
minibus	mid-engined	
lorry	limousine	
limo	front-engined	
motorcycle	moped	
bike	motorhome	
motorhome	mercedes-benz	
taxicab	bike	
roadster	rear-engined	
wagon	three-wheeled	
		bus
minibus	buses	
tram	tram	
buses	metrobus	
jeepney	intercity	
taxicab	busses	
motorcoach	fixed-route	
taxi	minibus	
trolleybus	inter-city	
lorry	ksrtc	
truck	commuter	
metrobus	apsrtc	
streetcar	msrtc	

busses	inter-urban	
ferryboat	dial-a-ride	
trolley	mini-bus	
tramcar	light-rail	
railcar	rail	
railmotor	transit	
intercityexpress	trolleybus	
train	limited-stop	
		hospital
sanatorium	clinic	
hospice	hospitals	
sanitorium	infirmary	
hospitals	hospice	
sanitarium	lying-in	
clinic	dispensary	
infirmary	polyclinic	
polyclinic	sanatorium	
dispensary	convalescent	
orphanage	mulago	
poorhouse	addenbrooke	
almshouse	bethlem	
workhouse	psychiatric	
institutet	maudsley	
leprosarium	siriraj	
rikshospitalet	sanitarium	
heliport	in-patient	
gaol	incurables	
guesthouse	orthopaedic	
motherhouse	westmead	
		hotel
motel	motel	
hotels	restaurant	
casino	doubletree	
restaurant	sheraton	
inn	hotels	
guesthouse	ritz-carlton	
tavern	sofitel	
cafe	westin	
ritz-carlton	ramada	
nightclub	casino	
travelodge	kempinski	
pizzeria	mansion	
roadhouse	inn	
boardinghouse	cafe	
caf©	tavern	
condo	apartments	

brewpub	boutique	
sheraton	nightclub	
steakhouse	marriott	
brasserie	travelodge	
		gun
guns	guns	
handgun	cannon	
machinegun	howitzer	
howitzer	sub-machine	
pistol	flamethrower	
rifle	belt-fed	
shotgun	37mm	
firearm	smoothbore	
cannon	pistol	
musket	shkas	
crossbow	105mm	
autocannon	40mm	
phaser	gatling	
flamethrower	recoilless	
revolver	76mm	
carbine	3-inch	
machine-gun	rifle	
weapon	88mm	
carronade	large-caliber	
pounder	autocannons	
		bomb
bombs	bombs	
firebomb	detonated	
landmine	detonates	
car-bomb	detonate	
grenade	booby-trap	
torpedo	detonating	
ied	firebomb	
warhead	car-bomb	
bomber	exploded	
bomblets	detonation	
missile	warhead	
nuke	500-pound	
detonator	b61	
booby-trap	laser-guided	
kamikaze	blast	
munition	explosives	
explosives	detonations	
machinegun	landmine	
a-bomb	tallboy	
firebombs	thermonuclear	
		horse

horses	horses	
goat	standardbred	
dog	saddlebred	
stallion	gelding	
mule	thoroughbred	
bronc	stallion	
cow	racehorses	
unicycle	dog	
greyhound	riderless	
bareback	gaited	
camel	bronc	
appaloosa	percheron	
saddlebred	pony	
colt	trotting	
zebu	harness	
donkey	chariot	
sidesaddle	appaloosa	
racehorse	sulky	
elephant	racehorse	
pony	greyhound	
		fox
daystar	abc	
nbc	cbs	
byutv	nbc	
kron	wxyz-tv	
wolf	msnbc	
cbs-tv	ctv	
familynet	wsvn	
abc	familynet	
wccb	wttg	
oln	wjbk	
wjar	wfxt	
hdnet	espn	
telefutura	wofl	
woodchuck	cnn	
nbc-tv	oln	
soapnet	blitzer	
cinemax	nesn	
wdiv	wesh	
mundofox	wb	
coyote	wgn-tv	
		table
tables	tables	
leaderboard	sortable	
sideboard	wikitable	
chessboard	look-up	
textbox	foosball	

taskbar	toc	
gameboard	bulleted	
worksheet	ping-pong	
tray	billiard	
viewport	table-tennis	
dais	textbox	
flowchart	tray	
playfield	lookup	
mantelpiece	wikitables	
stepladder	brackets	
cladogram	header	
letterbox	footer	
windowsill	tabular	
bookcase	menu	
wikitable	carom	
		bowl
bowls	xliii	
superbowl	xlii	
arenabowl	xliv	
wcws	bowls	
wnit	xlvi	
nlcs	tostitos	
arenacup	xli	
postseason	xxxviii	
nit	xlv	
xliii	xxxv	
llws	xxxix	
beanpot	xxxvii	
xlv	xlvii	
triplemaną	xxxvi	
alcs	xxxiv	
nlds	bluebonnet	
cup	gator	
kvalserien	xxviii	
tourney	xxxii	
cws	xxxi	
		guitar
saxophone	harmonica	
bass	mandolin	
mandolin	bass	
harmonica	drums	
accordion	guitars	
trombone	keyboards	
violin	accordion	
banjo	banjo	
guitars	saxophone	
cello	12-string	

piano	ukulele	
vibraphone	trombone	
sax	fiddle	
trumpet	autoharp	
autoharp	melodica	
clarinet	percussion	
sitar	vibraphone	
fiddle	tambourine	
drums	vocals	
marimba	fretless	
		piano
violin	violin	
cello	cello	
harpsichord	harpsichord	
saxophone	clarinet	
clarinet	viola	
guitar	flute	
trombone	bassoon	
mandolin	violoncello	
vibraphone	oboe	
marimba	concerto	
accordion	saxophone	
pianoforte	accordion	
bassoon	harp	
fortepiano	trombone	
violoncello	sonatas	
trumpet	trumpet	
harmonica	mandolin	
clavinet	pianoforte	
clavichord	vibraphone	
euphonium	concertos	

Top20 contexts word2vec(top20_word2vec_contexts.txt top20_word2vec_1st_order.csv):

dependency	bow5	words
		car
adpmod:byl_commute	racing	
amod_street-legal	mygale	
conj_hovercraft	bmw	
amod_newly-designed	driver	
amod_liter	motor	
amod_late-model	cars	
poss_brink	dealership	
compmod_m1918	parked	
adpmod:froml_tossed	rear-drive	
compmod_high-wing	accident	
poss_waltrip	mid-engined	
adpmod:byl_escapes	dealerships	
amod_requisitioned	touring	

compmodl_rallying	champ	
nsubjl_drivers	race	
compmod_rigid	toyota	
adpmod:insidel_placing	rental	
compmod_hilux	suv	
apposl_bike	truck	
poss_matty	auto	
		bus
adpmod:byl_commute	buses	
amod_east-bound	ksrtc	
conj_hovercraft	samtrans	
adpmod:onl_ridership	seabus	
compmod_airlink	smrt	
compmod_operates	connexxion	
conj_busses	inter-city	
compmod_xpt	intercity	
compmod_yrt	msrtc	
dobjl_onboard	transit	
amod_20-bit	double-decker	
compmod_citybus	tram	
amod_requisitioned	commuter	
adpmod:between_belfast	apsrtc	
amod_street-legal	services	
compmod_n11	routes	
compmodl_hookups	hiroden	
amod_newly-designed	metrobus	
adpmod:like_express	kmb	
compmod_weka	fixed-route	
		hospital
compmod_siriraj	bethlem	
compmod_safdarjung	moorfields	
adpmod:of_nuova	psychiatric	
compmod_strangeways	hospitals	
amod_maximum-security	infirmary	
compmod_armley	foundling	
compmod_combermere	siriraj	
compmod_fresnes	maudsley	
compmod_eastview	westmead	
compmod_desloge	bellevue	
compmod_monklands	convalescent	
compmod_nudgee	polyclinic	
compmod_longmeadow	maternity	
compmod_edgemont	sunnybrook	
compmod_southridge	soroka	
compmod_archbold	clinic	
compmod_shinagawa	mulago	
compmod_eppley	in-patient	
compmod_nantong	dispensary	

compmod_ravenscourt	deaconess	
	hotel	
compmod_nymphenburg	hotels	
compmod_dolmabah§e	westin	
compmod_whitwell	radisson	
conj_guesthouses	kempinski	
compmod_ravenscourt	sofitel	
compmod_hanworth	ramada	
compmod_siriraj	biltmore	
compmod_strangeways	ritz-carlton	
compmod_safdarjung	sheraton	
compmod_armley	marriott	
adpmod:onl_renovations	waldorf-astoria	
compmod_manresa	five-star	
rcmod_renting	5-star	
compmod_portchester	crowne	
compmod_eastview	doubletree	
compmod_combermere	restaurant	
adpmod:nearl_parked	hyatt	
compmod_kirkdale	hilton	
compmod_edgemont	luxury	
compmod_blackness	luxurious	
		gun
num_88mm	guns	
adpmod:withl_rearmed	submachine	
compmod_m1918	machine	
compmodl_fellatio	gatling	
num_60mm	sub-machine	
adpmod:ofl_hilt	howitzer	
compmod_karabiner	rifle	
compmod_t-55	40mm	
adpmod:forl_cartridges	11-inch	
compmodl_cwt	emplacements	
compmod_varmint	muzzle-loading	
amod_newly-designed	20mm	
conjl_turban	75mm	
rcmod_crushes	smoothbore	
adpmod:froml_bled	turrets	
amod_point-and-shoot	recoilless	
compmod_mlrs	5-inch	
compmod_bvr	turret	
compmodl_set-ups	breech-loading	
adpmod:withl_pistol	anti-aircraft	
		bomb
num_88mm	bombs	
adpmod:on_pentagon	detonated	
compmodl_splashes	detonates	
adpmod:byl_unharmed	detonate	

adpmod:withl_rearmed	atomic	
compmod_single-car	exploded	
compmod_m1918	detonating	
compmod_phishing	bomber	
compmodl_fellatio	bombing	
rcmod_bursts	blast	
compmod_decapitation	bombings	
adpmod:over_berlin	booby-trap	
num_60mm	landmine	
compmod_nega	v-1	
rcmod_crushes	hiroshima	
adpmod:at_wonsan	nuclear	
conjl_hellcat	laser-guided	
compmod_bvr	explodes	
compmod_econoline	blasts	
compmod_t-55	detonation	
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amod_gaited	horses	
nsubjpassl_spooked	standardbred	
compmodl_drovers	thoroughbred	
dobjl_shoe	trotting	
adpmod:byl_commute	riding	
rcmod_roams	racing	
poss_quixote	ridden	
compmod_ch-53e	galloping	
appos_pony	bred	
compmod_poitevin	gelding	
adpmod:ofl_hilt	stud	
adpmod:byl_escapes	appaloosa	
compmodl_fillet	pommel	
compmodl_cogburn	bareback	
compmod_beardless	bronc	
apposl_bike	sired	
compmod_m1918	thoroughbreds	
poss_quagmire	friesian	
conjl_turban	stables	
adpmod:byl_foot	aqha	
		fox
amod_crab-eating	vulpes	
appos_canadensis	news	
compmodl_subchannels	movietone	
conj_mattel	owned-and-operated	
compmod_jacki	nbc	
conjl_raimi	cbs	
conjl_corgan	terrier	
conjl_leda	affiliate	
conj_bluebird	cnn	

conj_nolte	msnbc	
conjl_browder	abc	
conj_keeler	espn	
conjl_steinem	mynetworktv	
conjl_thurmond	nine-tailed	
conjl_melly	wb	
conjl_seaver	wish-tv	
compmodl_e-type	wtae-tv	
apposl_msnbc	blitzer	
conjl_devitt	marten	
conj_o'hare	cw	
		table
adpmod:inl_rows	sortable	
adpmod:offl_knocks	tables	
adpmod:onl_seventh	tennis	
amod_ten-foot	lookup	
compmod_abydos	billiards	
amod_25-metre	foosball	
adpmod:intol_face	periodic	
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adpmod:onl_substance	snooker	
adpmod:onl_slides	below	
amod_rooftop	round	
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amod_end-blown	guitars	
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adpmod:forl_adagio	nyckelharpa	
adpmod:onl_thompson	glockenspiel	
appos_mandolin	6-string	
dep_keyboard	tambourine	
adpmod:ofl_virtuoso	banjo	
adpmod:onl_foster	vocals	
amod_necked	harmonica	
conjl_flinders	fretless	
adpmod:onl_supplemented	ukulele	
possl_pickups	12-string	
amod_banjo	benmont	
compmod_sandberg	six-string	
adpmod:ofl_sweethearts	riffs	
poss_diddley	piano	
depl_trumpet	accordion	
adpmod:onl_pianist	melodica	
		piano
adpmod:forl_adagio	violin	
amod_end-blown	sonata	
conjl_bongos	cello	
adpmod:onl_harris	concerto	
adpmod:ofl_virtuoso	op	
adpmod:onl_thompson	harpsichord	
conj_back-up	concertos	
compmod_kreutzer	viola	
compmod_vomeronasal	violoncello	
adpmod:onl_supplemented	sonatas	
appos_mandolin	divertimento	
apposl_prelude	pianoforte	
adpmod:onl_foster	e-flat	
compmod_akiyoshi	concerti	
dep_keyboard	concertante	
compmod_sandberg	clarinet	
conjl_kabuki	sonatina	
amod_necked	bassoon	
dobjl_syncing	nyckelharpa	

depl_trumpet	b-flat	