

CAN Treaties – Methods Overview 2 (Douglas Treaties aggregated)

Using String Kernels: When we use string kernels to measure the similarity between two texts, we look at common sequences of characters. Using the term “majesti” as an example, with a specified length of 5 characters:

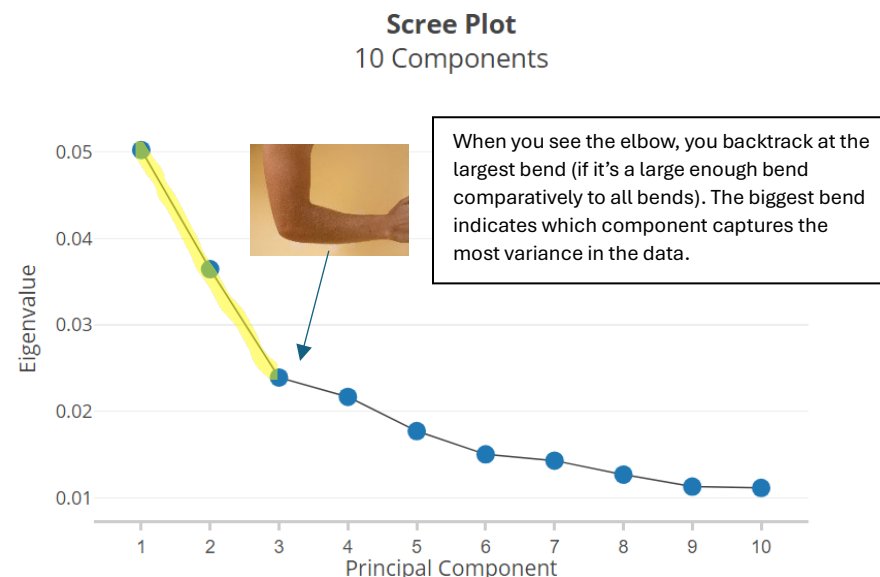
1. **Split** “majesti” into all possible 5-character sequences (substrings):
 - a. “majes”
 - b. “ajest”
 - c. “jesti”
2. **Compare Substrings:** We compare these 5-character sequences with the 5-character sequences from another text.
 - a. e.g., if the other treaty text also has “majesty”, it would have the same substrings:
 - i. “majes”
 - ii. “ajest”
 - iii. “jesty” (which shares “jesti” with “majesti”)
3. **Count Common Substrings:** We count how many of these 5-character sequences are common between the two texts. The more common sequences they have, the more similar the texts are considered to be.

Ultimately, this is how we get the graph(s) of the “thing” we want to look at – the overall theme or commonality across all the treaties – because we’ve computed the **Kernel Principal Component Analysis (KPCA)**. For Spirling this was harshness.

How many “things” are there? – we can argue for 1 or 2:

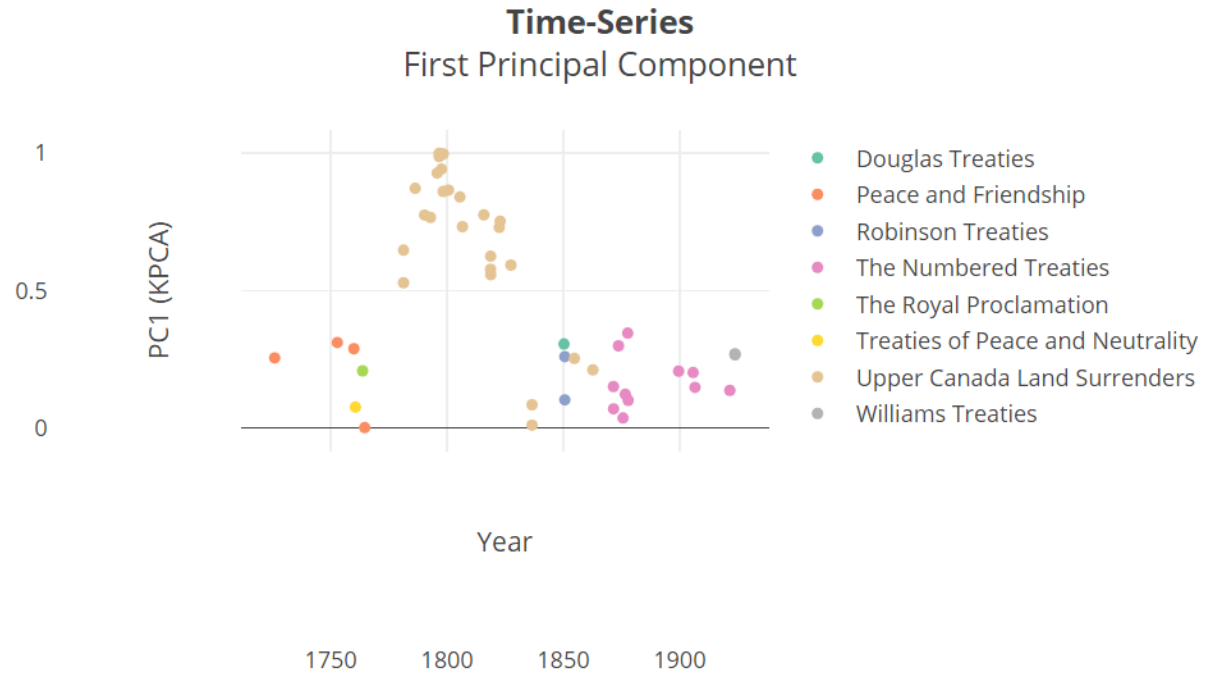
We are *definitively* looking for a **1st** and a **2nd** component:

- **Eigenvalues:** indicates the amount of variance in the data that is explained by its corresponding principal component.
 - o Higher eigenvalues mean that the principal component captures more variance from the data.



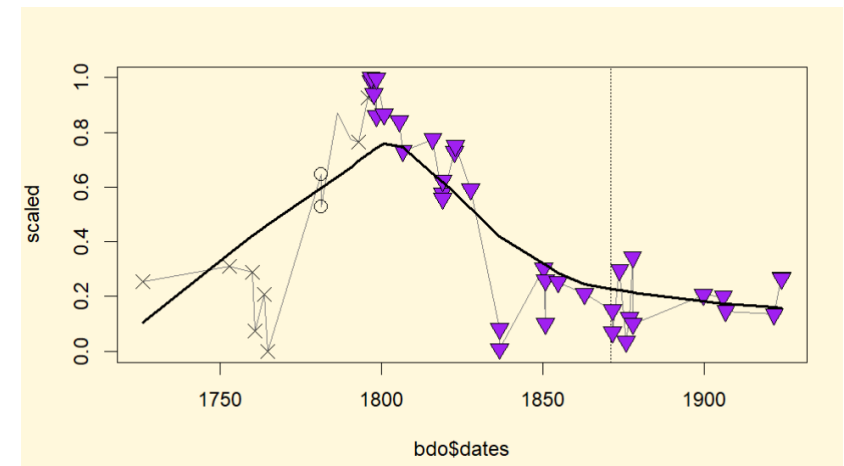
Component 1 Graph – “the main thing”:

- Here the early Upper Canada Land Surrenders seem to be the distinguishers; you’re either a UCLS (high on KPC1) or you’re not).

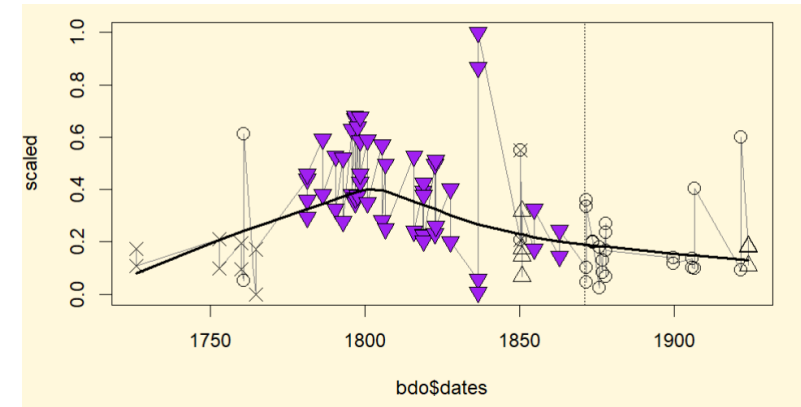
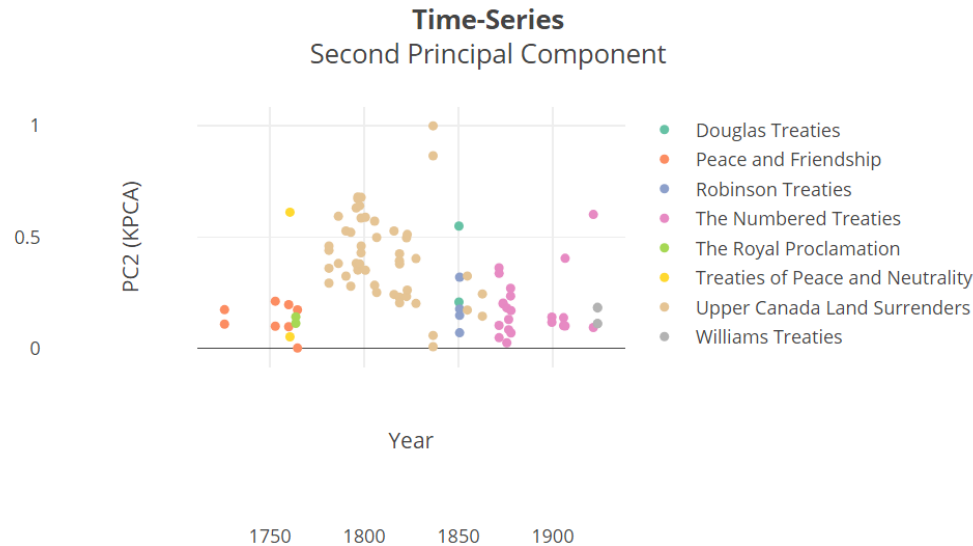


This is a graph mirroring Spirling’s visual – with a trendline for illustrative purposes.

- We’ll be working on adjusting these graphs in a way that can clearly distinguish each individual treaty in a more visually appealing manner.



Component 2 Graph – the “secondary thing”:



Here’s the “**loadings**” of each treaty on each of the “things”.

- e.g., UCLS09 is very high on **KPC1**, which UCLS22 is the low on.
- e.g., UCLS23 is very high on **KPC2**, which WT02 is lowest on.
- Components might reflect the varying approaches to treaty-making, where some focus more on legal precision and renunciation of claims, while others emphasize the Crown’s paternalistic role and efforts to “civilize” the Indigenous people (see below).

1	Treaty	KPC1 Score	KPC2 Score	25	UCLS04.txt	1.562187026	0.137462419
2	DT01.txt	0.365997315	1.986511991	26	UCLS05.txt	1.475018174	-0.196734794
3	PF01.txt	-0.433618898	0.955408352	27	UCLS06.txt	2.201272696	0.518370654
4	PF02.txt	-0.46436655	0.643359549	28	UCLS07.txt	2.224251753	0.486947295
5	PF03.txt	-0.576284177	2.318945615	29	UCLS08.txt	1.791256397	0.82391552
6	PF04.txt	-0.944662087	0.44561202	30	UCLS09.txt	2.352969987	0.270438884
7	RT01.txt	0.105598243	-0.53590257	31	UCLS10.txt	2.36552682	0.37083923
8	RT02.txt	0.2828898	-0.051226808	32	UCLS11.txt	2.306705695	1.006579958
9	NT1001.txt	-1.241318152	-0.684492431	33	UCLS12.txt	1.633327703	0.227701891
10	NT101.txt	-0.874829439	-1.058420134	34	UCLS13.txt	1.465755021	-0.258263388
11	NT1101.txt	-1.023067191	-0.789653468	35	UCLS14.txt	0.902749912	-0.497543695
12	NT201.txt	-0.562745736	-1.171191867	36	UCLS15.txt	1.062280275	-0.572681924
13	NT301.txt	-0.631651528	-1.292778541	37	UCLS16.txt	0.07219438	-0.669402288
14	NT401.txt	-0.423347046	-1.255132203	38	UCLS17.txt	0.251366793	-0.695413668
15	NT501.txt	-0.201009769	-1.330358091	39	UCLS18.txt	-0.116225576	-0.87463513
16	NT601.txt	-0.354672826	-1.359528358	40	UCLS19.txt	0.661287878	-0.684271265
17	NT701.txt	-0.784275959	-1.262633174	41	UCLS20.txt	0.723090633	-0.49487082
18	NT801.txt	-1.820207399	-0.848257377	42	UCLS21.txt	-0.086162045	-0.92591273
19	NT901.txt	-1.382253063	-1.035716293	43	UCLS22.txt	-2.562577813	3.731393795
20	RP01.txt	-0.675327623	0.160934124	44	UCLS23.txt	-2.964119904	4.667799607
21	TPN01.txt	-1.600467137	2.203679384	45	UCLS24.txt	-1.848642881	-0.094079387
22	UCLS01.txt	0.52159721	1.126045073	46	UCLS25.txt	-2.092642776	-0.672217198
23	UCLS02.txt	1.041660848	-0.060355831	47	WT01.txt	-1.85686822	-1.624562472
24	UCLS03.txt	2.072943667	0.547562167	48	WT02.txt	-1.92058443	-1.633271622

Component 1 – Formality and Legal Precision vs. Paternalism and Advisory Tone (?)

Highest (UCLS09.txt):

- Highly formal and legalistic, detailing a land transaction between the Chippewa Nation and the British Crown.
 - o Precise geographical descriptions, a thorough outline of the transaction's terms, and a strong emphasis on the renunciation of any future claims by the Chippewa Nation.

Themes: Formal land cession, detailed legal language, renunciation of future claims, strong focus on geographic boundaries and legal titles.

Lowest (UCLS22.txt):

- Less formal and more advisory in tone, with the speaker (likely a representative of the Crown) addressing the Indigenous people as "My Children" and discussing the necessity of new arrangements due to encroachment by settlers.
 - o Emphasizes the paternalistic role of the Crown, the protection of Indigenous people, and the possibility of relocating to areas where they can be "civilized."

Themes: Paternalism, advisory tone, less formal legal language, focus on the relationship and protection.

Component 1: might represent a spectrum from formal, legalistic treaties involving precise land cession (high values) to more paternalistic, advisory communications focused on protection and relocation (low values).

Component 1 – High vs. Low Comparison

UCLS09.txt

To all whom these presents may come, – GREETING:

WHEREAS we the principal Chiefs, Warriors, and People of the Chippewa Nation of Indians being desirous for a certain consideration hereinafter mentioned of selling and disposing of a certain parcel or tract of land situated and lying on the north side of the River Thames or River La Tranche and known in the Indian name by Escunnisepe unto His Britannic Majesty King George the Third our great Father.

NOW KNOW YE, that we the said principal Chiefs, Warriors and People of the Chippewa Nation for and in consideration of the sum of twelve hundred pounds Quebec currency value in goods estimated according to the Montreal price now delivered to us, the receipt whereof we hereby acknowledge, have give, granted, sold, disposed of and confirmed, and by these presents do give, grant, sell, dispose of and confirm forever unto Alexander McKee, Esquire, Deputy Superintendent General and Deputy Inspector General of Indians and of their affairs on behalf of His said Britannic Majesty King George the Third His heirs and successors, all that parcel or tract of land situated and lying on the north side of the River Thames as aforesaid, beginning at a certain station on the north bank of the said river about nineteen miles above the Delaware Village following the windings of the said river and about twelve miles distant from the said village in a direct northerly course, being about two miles above a lime stone rock and spring on the said river which station will be more perfectly found by a line run from the main or lower fork at London six miles on a course south, sixty-eight degrees thirty miles; thence north sixty-eight degrees thirty minutes east twelve miles' thence south twenty-one degrees thirty minutes east till it intersects a right line running from the upper forks of the said river at Oxford to the main or lower forks of the said river at London; thence along the said line to the said upper forks on a course north sixty-eight degrees thirty minutes east; thence down the said River Thames following the several winding and courses with the stream to the place of beginning. To have and to hold the said parcel or tract of land together with all the woods and waters thereon situate lying, and being unto the said Alexander McKee, Esquire, for and on behalf of His said Britannic Majesty King George the Third His heirs and successors for ever free and clean of and from all claims, rights, privileges, or emoluments which we the said Chiefs, Warriors and People of the said Chippewa Nation might have before the execution of these presents, and free and clear of any pretended claim which our children or descendants may hereafter make the same, hereby renouncing and forever absolving ourselves, our children, descendents and posterity of all title to the said parcel or tract of land, the soil, wood, and waters thereof, in favour of the said Alexander McKee, Esquire, for and on behalf of His said Britannic Majesty, His heirs and successors for ever.

IN WITNESS WHEREOF, we have for ourselves and the rest of our Nation hereunto set out respective marks and seals this seventh day of September, in the thirty sixth year of the reign of King George the Third, having first heard this instrument openly read and rehearsed in our own language and fully approved by ourselves and our Nation. And in the year of our Lord one thousand seven hundred and ninety six.

Present at the execution and delivery of this instrument, and witnesses thereto:

UCLS22.txt

MY CHILDREN:

Seventy snow seasons have now passes away since we met in Council at the crooked place (Niagara), at which time and place your Great Father, the King, and the Indians of North America tied their hands together by the wampum of friendship.

Since that period of various circumstances have occurred to separate from your Great Father many of his red children, and as an unavoidable increase of white population, as well as the progress of cultivation, have had the natural effect of impoverishing your hunting grounds it has become necessary that new arrangements should be entered into for the purpose of protecting you from the encroachment of the whites.

In all parts of the word farmers seek for uncultivated land as eagerly as you, my red children, hunt in your forest for game. If you would cultivate your land it would then be considered your own property, in the same way as your dogs are considered among yourselves to belong to those who have reared them; but uncultivated land is like wild animals, and your Great Father, who has hitherto protected you, has now great difficulty in securing it for you from the whites, who are hunting to cultivate it.

Under these circumstances, I have been obliged to consider what is best to be done for the red children of the forest, and I now tell you my thoughts.

It appears that these islands on which we are now assembled in Council are, as well as all those on the north shore of Lake Huron, alike claimed by the English, the Ottawas, and the Chippewas.

I consider that from the facilities and form their being surrounded by innumerable fishing island, they might be made a most desirable place of residence for many Indians who wish to be civilized, as well as to be totally separated from the whites; and I now tell you that your Great Father will withdraw his claim to these islands and allow them to be applied for that purpose.

Are you, therefore, the Ottawas and Chippewas, willing to relinquish your respective claims to these islands and make them the property (under your Great Father's control) of all Indians whom he shall allow to reside on them; if so, affix your marks to this my proposal.

MANTIWANING, 9th August, 1836.

Component 2 – Promises of Protection and Relocation vs. Legal and Financial Agreements (?)

Highest vs. Lowest Treaty

Highest (UCLS23.txt):

- Highly formal, describing the surrender of land by the Sauking tribe to the Crown.
 - o Includes a proposal for the Sauking to relocate and be provided with houses and resources to become civilized. It emphasizes the Crown's control over the lands and the promises made to protect the Indigenous people from encroachments.

Themes: Land surrender, formal agreements, promises of protection, relocation and civilization efforts.

Lowest (WT02.txt):

- Formal and complex, dealing with the rights, titles, and interests of the Mississauga Tribe in Ontario.
 - o Extensive legal descriptions of the land, references to previous treaties, and agreements on compensation.
 - o Heavily focused on legal terms and conditions, including specific rights, boundaries, and financial compensations.

Themes: Formal legal structure, complex legal terminology, detailed land descriptions, financial compensation.

Component 2: might represent a spectrum from treaties focusing on promises of protection and relocation under the Crown's control (high values) to very formal, complex legal agreements involving detailed descriptions of land rights and financial compensations (low values).

Component 2 – High vs. Low Comparison

UCLS23.txt

To the Sauking:

MY CHILDREN,

You have heard the proposal I have just made to the Chippewas and Ottawas, by which it has been agreed between them and your Great Father that these islands (Manatoulin), on which we are now assembled, should be made, in Council, the property (under your Great Father's control) of all Indians whom he shall allow to reside on them.

I now propose to you that you should surrender to your Great Father the Sauking Territory you at present occupy, and that you should repair either to this island or to that part of your territory which lies on the north of Owen Sound, upon which proper houses shall be built for you, and proper assistance given to enable you to become civilized and to cultivate land, which your Great Father engages for ever to protect for you from the encroachments of the whites.

Are you there, the Saukin Indians, willing to accede to this arrangement; if so, affix your marks to this my proposal.

MANITOWANING, 9th August, 1836.

WT02.txt

ARTICLES OF A TREATY made and concluded on the fifteenth day of November in the year of Our Lord One thousand nine hundred and twenty-three, between His Most Gracious Majesty, George the Fifth, of the United Kingdom of Great Britain and Ireland, King, Defender of the Faith, Emperor of India, by His Commissioners, Angus Seymour Williams, of the City of Ottawa, in the Province of Ontario, Esquire, Barrister-at-law, and Departmental Solicitor of the Department of Indian Affairs: Robert Victor Sinclair, of the said City of Ottawa, Esquire, one of His Majesty's Counsel, learned in the law, and Uriah McFadden, of the City of Sault Sainte Marie, in the said Province, Esquire, one of His Majesty's Counsel learned in the law, the said Angus Seymour Williams, Chairman of the said Commission, representing the Dominion of Canada, and the said Robert Victor Sinclair and Uriah McFadden, representing the Province of Ontario, of the One Part, and the members of the Mississauga Tribe, inhabiting, as members of bands thereof, reserves at Rice Lake, Mud Lake, Scugog Lake and Alderville, all in the Province of Ontario, by their chiefs and headmen, of the Other Part.

WHEREAS, the Mississauga Tribe above described, having claimed to be entitled to certain interests in the lands in the Province of Ontario, hereinafter described, such interests being the Indian title of the said tribe to fishing, hunting and trapping rights over the said lands, of which said rights, His Majesty, through His said Commissioners, is desirous of obtaining a surrender, and for such purpose has appointed the said Commissioners, with power on behalf of His said Majesty, to enquire into the validity of the claims of the said tribe, and, in the event of the said Commissioners determining in favour of the validity thereof, to negotiate a treaty with the said tribe for the surrender of the said rights upon the payment of such compensation therefor as may seem to the said Commissioners to be just and proper:—

AND WHEREAS the said Commissioners, having duly made the said enquiry, have determined in favour of the validity of the said rights.

AND WHEREAS the Indians belonging to the said tribe, having been duly convened in Council, at the respective places named hereunder, and having been requested by the said Commissioners to name certain chiefs and headmen to be authorized on their behalf to conduct negotiations with the said Commissioners for a surrender of the said rights and to sign a treaty in respect thereof and to become responsible to His Majesty for the faithful performance by the said tribe and by the respective bands thereof inhabiting the said reserves, of such obligations as shall be assumed by them under such treaty, the said Indians have therefore appointed for the purposes aforesaid the several chiefs and headmen who have subscribed to this treaty:

AND WHEREAS the said Commissioners, acting under the powers in them reposed as aforesaid, have negotiated the present treaty with the said tribe:

NOW THEREFORE THIS TREATY WITNESSETH that the said tribe and the Indians composing the same, occupying as members of bands the said reserves, by their chiefs and headmen, duly authorized thereunto as aforesaid, do hereby cede, release, surrender and yield up to the Government of the Dominion of Canada for His Majesty the King and His Successors forever, all their right, title, interest, claim, demand and privileges whatsoever, in, to, upon, or in respect of the lands and premises described as follows, that is to say:

FIRSTLY: All that parcel of land situate in the Province of Ontario and described as commencing on the northeasterly shore of Georgian Bay at that mouth of the French River which forms the boundary between the District of Parry Sound and the District of Sudbury; thence southerly and easterly along the shores of Georgian Bay to that point on Matchedash Bay where the land included in the surrender of the eighteenth day of November, 1815, of record in Book of Surrenders, Volume One, is reached, and including all the islands in the Georgian Bay waters in which the Indians making this treaty have any interest; thence along the easterly limit of the said lands purchased in 1815 to the Narrows between Lake Couchiching and Lake Simcoe; thence due east across the said Narrows; thence southerly and easterly following the east side of the Narrows and the north shore of Simcoe to the foot of McPhee Bay off the northerly part of Lake Simcoe; thence by a straight line easterly to a point thirty-three miles north of the northwest corner of the Township of Rawdon measured along the division line between the Counties of Hastings and Peterborough, which point is the most western northwest corner of the parcel surrendered on the

twenty-eighth day of November, 1822 (noted in Volume One of the Book of Surrenders as number twenty-seven and one-quarter, 27¼); thence following the north and west boundaries of the last mentioned parcel to the Ottawa River; thence westerly along the interprovincial boundary to the mouth of the Mattawa River; thence westerly along the interprovincial boundary to the mouth of the Mattawa River, Talon Chute and Talon Lake, Turtle Lake, and Trout Lake to the westerly point of Trout Lake; thence to the shore of Lake Nipissing at North Bay; thence by the north shore of Lake Nipissing to the French River; thence by those waters along the division line between the Districts of Parry Sound and Sudbury to the place of commencement: Excepting thereout and therefrom those lands which have already been set aside as Indian reserves. The parcel hereby surrendered contains seventeen thousand, six hundred square miles, more or less.

SECONDLY: All that parcel of land situate in the Province of Ontario and described as parts of the Counties of Northumberland, Durham, Ontario and York, commencing at the point where the easterly limit of that portion of the lands said to have been ceded in 1787, which was confirmed on the first of August, 1805, of record as number thirteen in Volume One, of the Book of Surrenders, intersects the northerly shore of Lake Ontario; thence northerly along the said easterly and northerly limits of the confirmed tract to the Holland River; thence northerly along the Holland River and along the westerly shore of Lake Simcoe and Kempenfelt Bay to the Narrows between Lake Couchiching and Lake Simcoe; thence southeasterly along the shores of Lake Simcoe to the Talbot River; thence easterly along the Talbot River to the boundary between the Counties of Victoria and Ontario; thence southerly along that boundary to the northwest angle of the Township of Darlington; thence along the northerly boundary line of the Townships of Darlington, Clarke, Hope and Hamilton to Rice Lake; thence along the southern shore of said lake to River Trent along the River Trent to the Bay of Quinte; thence westerly and southerly along the shore of the Bay of Quinte to the road leading to Carrying Place and Weller's Bay; thence westerly along the northern shore of Lake Ontario to the place of beginning: Excepting thereout and therefrom those lands which have already been set aside as Indian Reserves. The land hereby conveyed contains two thousand, five hundred square miles more or less.

AND ALSO all the right, title, interest, claim, demand and privileges whatsoever of the said Indians, in, to, upon or in respect of all other lands situate in the Province of Ontario to which they ever had, now have, or now claim to have any right, title, interest, claim, demand or privileges, except such reserves as have heretofore been set apart for them by His Majesty the King.

TO HAVE AND TO HOLD the same to His Majesty the King and His Successors forever:

AND THIS TREATY FURTHER WITNESSETH that in consideration of the aforesaid surrender, His Majesty, through His said Commissioners, hereby agrees, upon the execution of a treaty similar to this treaty by the Chippewa Tribe inhabiting as members of bands, reserves at Christian Island, Georgina Island and Rama, in the Province of Ontario, to pay to each member of the said Mississauga Tribe, being also a member of one of the said bands, the sum of twenty-five dollars, to be paid through the Indian agents for the respective bands, with a reasonable time after the execution of the said treaties, and a further sum of ---233,425.00 dollars--- to be administered for the said tribe by His Majesty's Department of Indian Affairs under and pursuant to the provisions of the Indian Act, Revised Statutes of Canada, 1906, Chapter Forty-three and its amendments; making together the sum of 250,000.00 dollars.

AND THE UNDERSIGNED chiefs and headmen, on their own behalf and on behalf of all the Indians whom they represent, do hereby solemnly covenant, promise and agree to strictly observe this treaty in all respects and that they will not, nor will any of them, nor will any of the Indians whom they represent, molest or interfere with the person or property of anyone who now inhabits or shall hereafter inhabit any portion of the lands covered by this treaty, or interfere with, trouble, or molest any person passing or travelling through the said lands or any part thereof, and that they will assist the officers of His Majesty in bringing to justice and punishment any Indian, party to this treaty, who may hereafter offend against the stipulations hereof or infringe the laws in force in the lands covered hereby:

AND IT IS FURTHER UNDERSTOOD that this treaty is subject to an agreement dated the day of April, A.D. 1923, made between the Dominion of Canada and the Province of Ontario, a copy of which is hereto attached.

IN WITNESS WHEREOF, His Majesty's said Commissioners and the said chiefs and headmen have hereunto set their hands and seals at the places and times hereinafter set forth, in the year herein first above written.

SIGNED AND SEALED at Alderville on the nineteenth day of November, A.D. 1923, by His Majesty's Commissioners and the undersigned chiefs and headmen in the presence of the undersigned witnesses, after first having been interpreted and explained.

SIGNED AND SEALED at Mud Lake on the fifteenth day of November, A.D. 1923, by His Majesty's Commissioners and the undersigned chiefs and headmen in the presence of the undersigned witnesses, after first having been interpreted and explained.

SIGNED AND SEALED at Rice Lake on the sixteenth day of November, A.D. 1923, by His Majesty's Commissioners and the undersigned chiefs and headmen in the presence of the undersigned witnesses, after first having been interpreted and explained.

SIGNED AND SEALED at Scugog Lake on the twenty-first day of November, A.D. 1923, by His Majesty's Commissioners and the undersigned chiefs and headmen in the presence of the undersigned witnesses, after first having been interpreted and explained.

MEMORANDUM OF AGREEMENT made this of April, 1923,

BETWEEN:

The Government of the Dominion of Canada, acting herein by the Honourable Charles Stewart, Superintendent General of Indian Affairs, of the first part,

AND

The Government of the Province of Ontario, acting herein by the Honourable Beniah Bowman, Minister of Lands and Forests for the said Province, of the other part

WHEREAS certain Indians of the Chippewa and Mississauga tribes claim that the said tribes were and are entitled to a certain interest in lands in the Province of Ontario to which the Indian title has never been extinguished by surrender or otherwise, the said lands being described as parts of the counties of Renfrew, Hastings, Haliburton, Muskoka, Parry Sound and Nipissing, and being bounded on the south and east by the lands included in the surrenders of the Indian title made on the 18th of November, 1815, the 5th of November, 1818, and November, 1822; on the north by the Ottawa and Mattawa Rivers and Lake Nipissing, and on the west by the lands included in the surrender of the Indian title made in 1850, known as the Robinson-Huron surrender, and by the Georgian Bay, the area in question including about 10,719 square miles.

AND WHEREAS a departmental enquiry made by the Department of Indian Affairs indicates that the said claim has such probable validity as to justify and require further investigation, and if found valid to be satisfied on such just and fair terms as may be settled by a treaty of surrender.

NOW THEREFORE THIS AGREEMENT made in pursuance of certain statutes of Canada and of the Province of Ontario, both entitled “an Act for the settlement of certain questions between the Governments of Canada and Ontario respecting Indian Lands,” the Statute of Canada having been passed in the 54th and 55th years of the reign of Her Majesty Queen Victoria and chaptered 5, and the statute of Ontario in the 54th year of Her Majesty’s said reign and chaptered 3.

WITNESSETH THAT the Governments of Canada and of the Province of Ontario have agreed as follows: ---

The Government of Canada will, pursuant to Part I of the Enquiries Act, R.S.C., 1906, c. 104, and amendments, appoint three persons as commissioners to enquire into the validity of the claim of the Chippewa and Mississauga Indians aforesaid, and will empower the said commissioners, in the event of their determining in favour of the validity of the said claim, to negotiate a treaty with the said Indians for the surrender of the said lands upon payment of such compensation as may be fixed by such treaty.

Of the three commissioners so named, one shall be selected by the Government of Canada, who shall be Chairman of the Commission, and the remaining two shall be selected by the Minister of Lands and Forests for the Province of Ontario and notified to the Superintendent General of Indian Affairs.

The question of the validity of said claim may be determined by any two of the said Commissioners and it shall be necessary that at least two of them of whom the chairman shall be one shall concur in any treaty which may be negotiated.

The expenses of the said commission, including the remuneration and expenses of the commissioners and any expenses incurred for securing the attendance of witnesses or otherwise, shall be payable by the Government of Canada, but the rates of remuneration of each of the commissioners selected by the Minister of Lands and Forests for the Province of Ontario shall be agreed upon between him and the Superintendent General of Indian Affairs before the Constitution of the Commission.

In the event of the commissioners negotiating a treaty with the Indians the compensation to be paid to such Indians shall be payable to the Dominion of Canada by the Province of Ontario from time to time in accordance with the terms of the treaty of surrender, and shall be applied by the Dominion of Canada in accordance with the said terms.

In the event of provision being made by such treaty of surrender for the setting apart of reserves for the Indians, the Dominion of Canada will bear the expense to be incurred in the location and survey thereof, and the Province of Ontario will concur in the setting apart of such reserves.

All such reserves shall be administered by the Dominion of Canada for the benefit of the band or bands of Indians to which each may be allotted; portions thereof may, upon their surrender for the purpose by the said band or bands, be sold, leased or otherwise disposed of by letters patent under the Great Seal of Canada, and the proceeds of such sale, lease or other disposition applied for the benefit of such band or bands, provided, however, that in the event of the band or bands to which any such reserve has been allotted becoming extinct, or if for any other reason such reserve or such portion thereof as remains undisposed of is declared by the Superintendent General of Indian Affairs to be no longer required for the benefit of the said band or bands, the same shall thereafter be administered by and for the benefit of the Province of Ontario, and any balance of the proceeds of the sale or other disposition of any portion thereof then remaining under the control of the Dominion of Canada shall, so far as the same is not still required to be applied for the benefit of the said band or bands of Indians, be paid to the Province of Ontario, together with accrued unexpended simple interest thereon.

IN WITNESS WHEREOF these presents have been signed by the parties thereto.

How do we figure out what the “things” are? – we combine 2 methods:

1. Vector-space analysis: interpret string kernels directly

- We’ve done this already to determine the **KPCA**, but we could analyze the string kernels directly. However, academics add on a 2nd method to interpret string-kernels because it provides more nuance. Thus, we add in...

2. Term Document Matrix conversion (stemming, etc.)

- Take the words and break them up into root components.
- Eliminate common words (said, the, etc.)
- Remove sparse terms (in our case, if the words don’t appear in 90% of documents they aren’t considered).
- Remove punctuation.

The argument is that using string kernels gives a more accurate *overall* representation of what the things are – because when you use **string kernels** the algorithm *preserves and considers the order that word appear in*. However, it’s easier to add on a **TDM-IDF** process to assess each word’s importance in a vacuum.

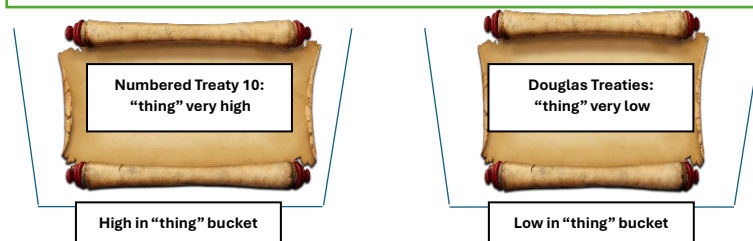
- Once we’ve stemmed, removed common words, etc. we feed them to two algorithms – **Random Forest** (Spirling) and **xgboost** (new age extremely powerful competition-winning predictive algorithm that uses Random Forest and **Gradient Descent**).

Importance Algorithms:

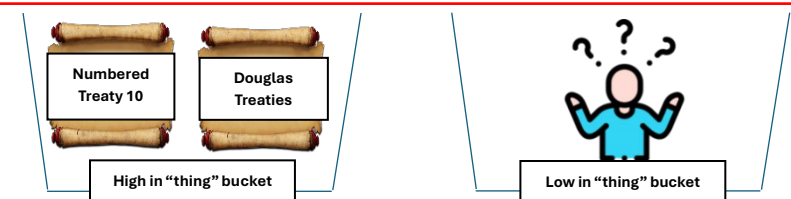
- (1) **Random Forest:** you can think of the entire sample of the treaties as the “forest”. The algorithm plants 500-2000 “trees” at random points (word stems) in each treaty. Each tree makes a predictive “bucketing” decision (simplified below) extending throughout the entire corpus before the algorithm aggregates its calculations.
- e.g., Planting a “**punish**” tree: In Numbered Treaty 10, “punish” might occur frequently, indicating it is high in the “thing.” Conversely, the Douglas Treaties might have few occurrences of “punish,” indicating they are low in the same “thing.”
 - The algorithm then asks: “If we split the treaties based on the occurrence of ‘punish,’ do they fall into the correct buckets?”

Numbered Treaty 10 **SHOULD** go into the bucket of “treaties high in thing,” and the Douglas Treaties would go into the bucket of “low in thing.”

If **punish** is **important**, we should see proper separation
= punish is important:



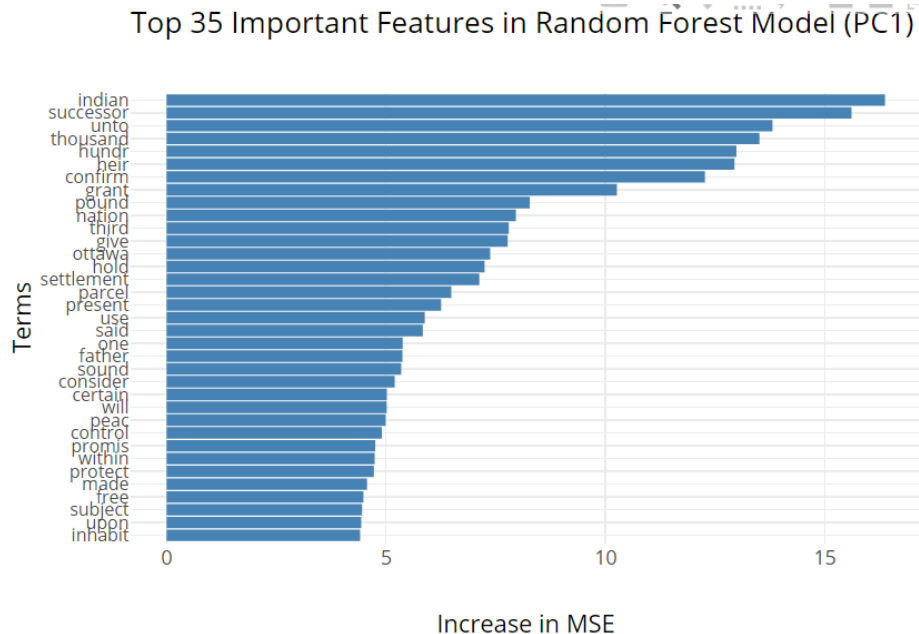
If **punish** is **not important**, we might see inaccurate separation;
we already know Douglas Treaties are low in thing, but “punish”
is putting them in the wrong bucket = punish not important:



- (2) **XGBoost**: Extreme Gradient Boosting builds a model in a stage-wise fashion, where each new tree corrects errors made by previous trees.
- XGBoost starts with a simple initial model, perhaps predicting the average value of “thing” across all treaties.
 - It calculates the difference (residual) between the actual values of “thing” (e.g., occurrences of important terms) and the predictions made by the initial model for each treaty.
 - A new decision tree is created to predict these residuals.
- e.g., Planting a “**punish**” tree:
- If “punish” appears often in a treaty, the tree might predict a higher residual (indicating the initial model underestimated the “thing” for this treaty).
 - If “punish” is rare, the tree might predict a lower residual (indicating the initial model overestimated the “thing”).
- The predictions from this new tree are added to the initial model to improve its accuracy.
- This process of calculating residuals, creating new trees, and updating the model continues iteratively, with each new tree focusing on the remaining errors from the previous iteration.
 - The final model is an ensemble of all the trees, where each tree contributes to refining the predictions.

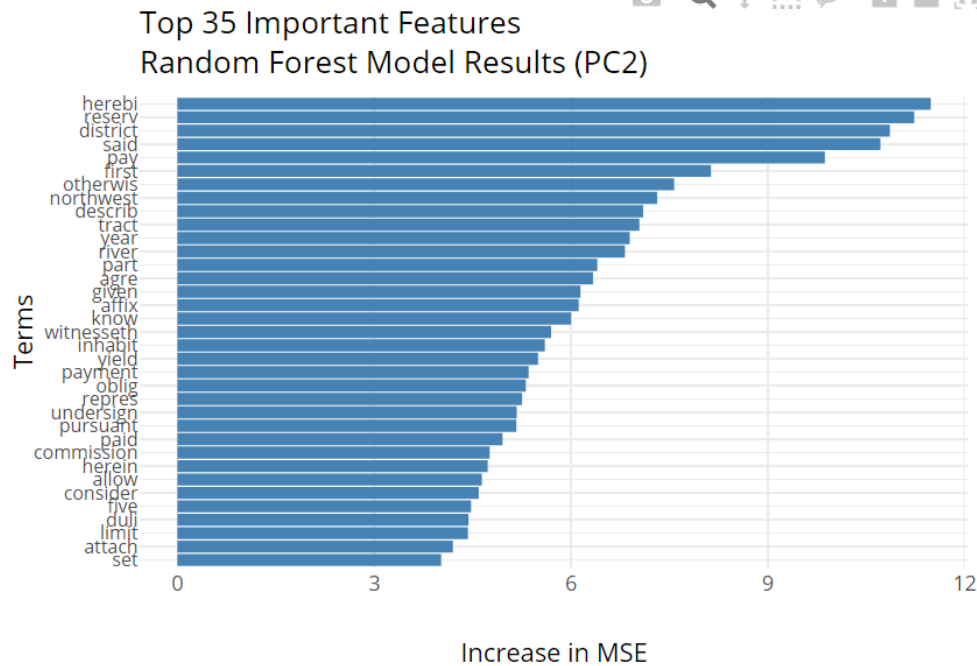
Algorithm Results – KPC1 (“main thing”):

- Here we have a graph of the most important features from KPC1 (the words that best separate the treaties into the correct “main thing” buckets), and the corresponding algorithms scores.



Random Forest - KPC1: Term	Importance	xgboost - KPC1: Feature	Gain	Cover	Frequency
indian	16.37059143	successor	0.544502	0.026263	0.013966
successor	15.60654934	indian	0.166202	0.028507	0.01676
unto	13.80577743	thousand	0.097457	0.01257	0.013966
thousand	13.50895678	confirm	0.032008	0.046128	0.030726
hundr	12.98415922	caus	0.026537	0.001908	0.002793
heir	12.93885244	ottawa	0.017876	0.006173	0.005587
confirm	12.26695445	give	0.016593	0.006622	0.00838
grant	10.26075882	promis	0.016012	0.001908	0.002793
pound	8.27665855	observ	0.011802	0.002245	0.002793
nation	7.95972444	nation	0.007936	0.006734	0.011173
third	7.796951614	ever	0.00786	0.004489	0.011173
give	7.772045273	abandon	0.007463	0.003928	0.013966
ottawa	7.374266548	children	0.007385	0.003479	0.005587
hold	7.24618643	heir	0.006721	0.011897	0.00838
settlement	7.126177306	affix	0.005339	0.014141	0.011173
parcel	6.487655297	hundr	0.003782	0.01358	0.013966
present	6.255820755	said	0.003635	0.004714	0.005587
use	5.883473782	settlement	0.003275	0.010887	0.011173
said	5.838820859	control	0.003076	0.003367	0.002793
one	5.379889772	acced	0.002454	0.179349	0.094972
father	5.374175893	agent	0.00242	0.001908	0.005587
sound	5.345744876	princip	0.002135	0.002357	0.002793
consider	5.198742213	also	0.001071	0.004377	0.011173
certain	5.019021897	affair	0.000717	0.006061	0.01953
will	5.016412095	wit	0.000584	0.005163	0.005587
peac	4.991944347	interest	0.000578	0.002132	0.002793
control	4.904803391	acknowledge	0.000519	0.007856	0.041899
promis	4.755405001	accru	0.000393	0.001347	0.005587
within	4.741992722	describ	0.00035	0.001796	0.005587
protect	4.723481554	pound	0.000297	0.017059	0.013966
made	4.568237167	britann	0.000287	0.002245	0.002793
free	4.484928299	within	0.000279	0.001908	0.002793
subject	4.455439314	alexand	0.000272	0.031538	0.02514
upon	4.435543643	save	0.000242	0.002132	0.002793
inhabit	4.410492051	aid	0.000213	0.001571	0.002793
receipt	4.255558559	acr	0.000195	0.002245	0.011173
wit	4.167078391	peopl	0.000157	0.002581	0.002793
seven	3.966576774	abid	0.000149	0.002132	0.002793
conclud	3.933957654	adjut	0.000143	0.00202	0.00838
five	3.684250848	account	0.000104	0.000898	0.002793
molest	3.675565457				
know	3.670503991				
begin	3.53953384				
return	3.535931688				
surrend	3.486222118				

Algorithm Results – KPC2 (“secondary thing”):



Random Forest - KPC2:	Term	Importance	xgboost - KPC2:	Feature	Gain	Cover	Frequency
	herebi	11.48518031		said	0.279109	0.021937	0.013699
	reserv	11.23342893		first	0.255499	0.007493	0.005479
	district	10.86262163		reserv	0.098943	0.031603	0.019178
	said	10.718272		affix	0.087409	0.083297	0.071233
	pay	9.8713808		know	0.0719	0.017811	0.013699
	first	8.135284192		herebi	0.068824	0.001086	0.00274
	otherwise	7.57452776		agre	0.02021	0.011186	0.008219
	northwest	7.314096654		allow	0.014072	0.05354	0.035616
	describ	7.101251225		make	0.013211	0.00619	0.010959
	tract	7.04358878		herein	0.01222	0.002932	0.00274
	year	6.89744787		district	0.01047	0.004778	0.005479
	river	6.824196087		solemn	0.010122	0.005864	0.005479
	part	6.402700762		acknowled	0.00948	0.006407	0.019178
	agre	6.33683381		part	0.005708	0.0101	0.016438
	given	6.145638228		payment	0.004849	0.00467	0.00274
	affix	6.118620057		confirm	0.004671	0.004127	0.005479
	know	6.0032879		given	0.00402	0.0101	0.013699
	witnesseth	5.698272522		come	0.003616	0.003475	0.005479
	inhabit	5.603225316		oblig	0.003307	0.002715	0.00274
	yield	5.498672695		acced	0.002955	0.16073	0.106849
	payment	5.355800299		direct	0.002168	0.006516	0.010959
	oblig	5.313316342		land	0.002119	0.004887	0.005479
	repres	5.256483857		along	0.001734	0.012381	0.008219
	undersign	5.17405869		nation	0.00128	0.001629	0.00274
	pursuant	5.167829888		tract	0.001248	0.008036	0.008219
	paid	4.957699596		acadi	0.001177	0.003584	0.013699
	commission	4.761350035		dominion	0.000992	0.002932	0.00274
	herein	4.731957073		aid	0.000796	0.000652	0.00274
	allow	4.642426719		act	0.000766	0.044418	0.046575
	consider	4.595191289		indian	0.00073	0.001412	0.005479
	five	4.477778599		across	0.000713	0.000326	0.00274
	duli	4.438836791		citi	0.000668	0.004778	0.00274
	limit	4.429648796		accord	0.000618	0.005104	0.024658
	attach	4.200812723		place	0.000489	0.001629	0.00274
	set	4.022086609		depart	0.000467	0.009774	0.005479
	confirm	3.986795221		abl	0.000448	0.001195	0.00274
	protect	3.964509306		abus	0.000373	0.001195	0.005479
	articl	3.812084814		approv	0.000311	0.000977	0.00274
	children	3.770817458		english	0.000226	0.042897	0.024658
	includ	3.731658887					
	properti	3.686813536					
	dollar	3.681810982					
	mention	3.612245067					
	twentyf	3.524912988					
	queen	3.521914301					
	western	3.506251134					
	hereaft	3.493654345					
	solemn	3.432784006					
	parti	3.412696257					
	whereof	3.347037536					
	becom	3.344272715					
	land	3.283796043					
	white	3.277504814					

- Here we have a graph of the most important features from KPC2 (the words that best separate the treaties into the correct “secondary thing” buckets), and the corresponding algorithms scores.

Component (“thing”) Correlations:

When **stemming** words, we erase word suffixes to obtain the “root” of the word.

Word stems with a high positive correlation appear more frequently/are more prominent in treaties that have high scores on the principal component.

- These stems are characteristic of whatever “thing” the KPC is capturing when it scores high.

Word stems with a high negative correlation appear more frequently or are more prominent in treaties that have low scores on the principal component.

- These stems are characteristic of treaties that represent the opposite end of whatever the “thing” we’ve captured is.

Word Stem correlations can be treated as Kernel Principal Component Loadings – how much each word affects the “thing(s)”.

There are 3677 terms captured in the documents (which we have the correlations for) so I’ll just include the most important ones for each of KPC1 & KPC2.

Correlations - KPC1:	Positive Term	Frequency	Correlation	Negative Term	Frequency	Correlation
	unto	27	0.7871176	indian	45	-0.6314852
	successor	34	0.78447023	council	23	-0.5883502
	heir	28	0.77696939	upon	27	-0.516292
	third	30	0.71906548	will	30	-0.5031648
	said	43	0.71138784	resid	12	-0.5009835
	confirm	24	0.70584576	proceed	15	-0.4979493
	hundr	42	0.69582848	therefor	20	-0.4939343
	nation	26	0.69406866	protect	11	-0.4909522
	georg	26	0.66728096	agre	30	-0.4661169
	receipt	14	0.66575614	necessari	16	-0.4580686
	begin	27	0.66169948	minist	10	-0.4552154
	grant	29	0.65551486	cultiv	15	-0.4546267
	hold	31	0.64878701	commission	13	-0.4479782
	thousand	41	0.64602226	made	34	-0.4431495
	forev	30	0.63679297	undersign	14	-0.4422695
	warrior	10	0.63410941	assist	15	-0.4363992
	sell	20	0.62990124	govern	19	-0.4335618
	parcel	19	0.61845268	asid	12	-0.4334942
	present	39	0.61151726	among	13	-0.4331596
	consider	36	0.60664102	arrang	14	-0.4298667
	instrument	13	0.60635092	depart	11	-0.4294233
	seven	24	0.59928245	territori	18	-0.4266367
	whereof	35	0.59312363	compens	12	-0.425783
	certain	32	0.56117439	treati	22	-0.4245979
	give	21	0.55535594	respons	13	-0.417154
	wood	21	0.55383435	becom	20	-0.4164327
	know	25	0.54218597	allow	21	-0.4139868
	execut	21	0.5413278	punish	13	-0.4135275
	clear	12	0.53543113	headmen	12	-0.4126532
	king	31	0.52992378	august	21	-0.4071728
	tract	36	0.52731255	white	20	-0.4066543
	upper	19	0.52689202	negoti	13	-0.4050632
	dispos	21	0.52309722	travel	12	-0.4044747
	peopl	26	0.49697146	assembl	12	-0.4009718
	princip	26	0.49389814	reason	13	-0.4002082
	lord	34	0.48456575	interest	25	-0.3995435
	estim	10	0.47819363	like	15	-0.3989338
	situat	26	0.47313224	infring	12	-0.3955106
	appurten	14	0.46961804	surrend	28	-0.3898219
				seem	12	-0.3894298
				assum	13	-0.3831754
				view	13	-0.3828101
				pass	15	-0.3797375
				possibl	11	-0.3788962
				oblig	14	-0.3778589
				offend	13	-0.3755991
				dominion	14	-0.375431
				just	13	-0.3749602
				interfer	14	-0.37415
				pursuant	12	-0.3724007

Correlations - KPC2:	Positive Term	Frequency	Correlation	Negative Term	Frequency	Correlation
	great	37	0.6363075	describ	27	-0.5274833
	father	14	0.63124764	northwest	21	-0.565425
	children	18	0.6186506	commission	13	-0.5418299
	protect	11	0.64933883	respons	13	-0.5157718
	assembl	12	0.64474668	reserv	27	-0.5047487
	properti	27	0.63794995	band	15	-0.498986
	now	36	0.60579204	assum	13	-0.4938562
	becom	20	0.60485558	dollar	15	-0.4935272
	white	20	0.5985758	gracious	16	-0.4925847
	cultiv	15	0.57866061	undersign	14	-0.4896728
	arrang	14	0.57670466	treati	22	-0.4807385
	proper	16	0.5690313	infring	12	-0.4805473
	allow	21	0.56669694	set	37	-0.4783191
	island	21	0.52019519	negoti	13	-0.4710283
	ottawa	16	0.51484937	duli	16	-0.4668614
	given	25	0.49250645	notifi	13	-0.4661865
	hous	11	0.48161912	pursuant	12	-0.4607742
	august	21	0.46592589	seem	12	-0.4576367
	assist	15	0.46364519	defin	12	-0.4573554
	just	13	0.45264093	hereinaft	23	-0.452604
	ever	32	0.45069817	right	33	-0.4523198
	resid	12	0.41595601	asid	12	-0.4521223
	mark	23	0.41222414	minist	10	-0.440131
	lie	21	0.40848192	inhabit	26	-0.4400151
	engag	14	0.40329212	headmen	12	-0.4392258
	consid	12	0.3926975	thereto	22	-0.4348076
	occupi	15	0.37658383	distribut	12	-0.4334548
	hunt	18	0.37219284	punish	13	-0.4310606
	form	16	0.37084308	subscrib	16	-0.4291769
	english	10	0.36396274	interest	25	-0.4286798
	might	13	0.35415422	interfer	14	-0.4281258
	council	23	0.35185754	queen	13	-0.426746
	red	11	0.35034196	travel	12	-0.4251581
	make	35	0.33771773	compens	12	-0.4248313
	like	15	0.33263254	obtain	16	-0.4212749
	made	34	0.33166649	otherwise	26	-0.4205801
	done	10	0.32603683	first	37	-0.4201488
	secur	15	0.31706721	offend	13	-0.4196852
	huron	15	0.31123102	whether	10	-0.4178179
	will	30	0.30755694	conduct	15	-0.4137275
	appear	10	0.30596824	five	28	-0.4061023
	whole	15	0.30409564	herabi	41	-0.4056714
	chippewa	17	0.30190136	stipul	13	-0.4032312
	free	20	0.30108577	famili	13	-0.400776
	come	15	0.28918734	provis	12	-0.4007308
	governor	18	0.27957607	bounti	11	-0.3995148
	new	10	0.27814071	deliber	11	-0.397237
	thought	10	0.27717398	annual	12	-0.3952204
	ground	15	0.26800168	upon	27	-0.3949171
	upon	27	0.26564427	canada	29	-0.3949171
	shall	35	0.2637361			
	know	25	0.2583585			
	moiest	18	0.24772292			
	settlement	23	0.23388388			