

**UNDERSTANDING THE REGIONAL AND CONSTITUTIONAL IMPACT  
OF CEDAW USING AUTOMATED CONTENT ANALYSIS  
OF NATION-STATE CONSTITUTIONS**

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## Understanding the Regional and Constitutional Impact of CEDAW Using Automated Content Analysis of Nation-State Constitutions

### **I. Introduction**

In 1979, the United Nations General Assembly adopted the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), the first legally binding international instrument to address women's political rights. Such an international instrument by itself is not the only driving force for social change, but international norms may be key in helping to foster a change in domestic law or constitutional structures. Constitutions can also express or signal a nation-state's commitment to certain social values, political norms or practices (Sajo and Uitz, 2010). If similar language to CEDAW appears in constitutional documents or is absent, then an indication of a state's posture on women's rights and human rights may be determined.

The European Union (EU) is a particularly interesting region for study. All of its member states have adopted CEDAW. All of these states have also been ranked on other indices such as the Human Development Index (HDI) and Gender Inequality Index (GII) which can supply some additional basis for comparison. The members of the European Union, except for the United Kingdom, also all have written constitutions and amendments which describe political rights. Therefore, our research can examine both quantitatively and qualitatively to what extent women's political rights are integrated into these state documents. Given that the European Union itself, in recent official speeches and documents, has publicly set a high priority on human rights and women's rights in particular (see European Union latest actions at: [http://eeas.europa.eu/human\\_rights/women/index\\_en.htm](http://eeas.europa.eu/human_rights/women/index_en.htm)) a study of constitutional language and CEDAW would provide an indicator of whether member states are following through on their commitments to formalizing women's rights.

To that end, this study explores the following questions: 1) whether the language of current nation-state constitutions in Europe show any specific recognition of equality for women after a country's adoption of CEDAW; 2)

whether differences exist in the approximation of constitutions of states of the European Union in the acceptance of women's formal political rights (in particular Articles 7 and 8 of CEDAW); and 3) how do the constitutions of European Union states rank or compare to each other in their approximation to the language of CEDAW generally?

The paper begins with a brief background history of CEDAW and update on the role of the European Union in encouraging the implementation of CEDAW. We note recent research on CEDAW's impact and review discussion in the academic literature. We then apply the content analysis methodology, ngram modeling, to identify key topical information surrounding women's rights and political participation in current member state constitutions of the European Union. In addition, we apply vector-space analysis to determine differences across the constitutions of multiple European countries. These findings help provide a greater understanding of the formal impact of CEDAW regionally and explore the usefulness of automated content analysis in ranking states.

### **Brief History of CEDAW and Background on CEDAW and the European Union**

Several women's rights instruments adopted by the United Nations preceded CEDAW, including the Convention on the Political Rights of Women in 1952; the Convention on the Consent to Marriage in 1957; and the Declaration on the Elimination of Discrimination against Women in 1967 which provided the foundation for CEDAW. These instruments demonstrated the growing awareness of the need for protection and promotion of women's human rights in the United Nations system, but remained fragmented and lacked force. (See A Short History of CEDAW Convention, <http://www.un.org/womenwatch/daw/cedaw/history.htm>, extracted 2/20/12).

In 1972, the United Nations Commission on the Status of Women (CSW) began discussions on the possibility of creating a binding treaty that would give strength to the provisions of the Declaration. The CSW approached the Secretary-General who then called upon the United Nations member states to share their views on this possibility. With the approval of the member states, the Commission and the working groups of the Third Committee of the General Assembly began

drafting a single, comprehensive international document which would call for the elimination of all forms of discrimination against women. Finally, in 1979, the United Nations General Assembly adopted CEDAW with 130 votes in favor and 10 abstentions. The Convention entered into force on September 3, 1981. Since then, 187 states have ratified CEDAW, with only five countries (Iran, Palau, Tonga, Somalia, Sudan, and the United States) still refusing to do so (Riggin, 2011; See also United Nations Treaty Collection, States Parties of the Convention on the Elimination of All Forms of Discrimination Against Women at: <http://treaties.un.org/doc/Publication/MTDSG/Volum%20I/Chapter%20IV/IV-8.en.pdf>).

Article 17 of the Convention established the Committee on the Elimination of Discrimination against Women which was formed in 1982. Consisting of twenty-three members elected by secret ballot, the Committee meets twice a year and reports on its activities to the United Nations General Assembly. Following the adoption by the United Nations of the 1999 Optional Protocol, the Committee, along with monitoring duties, has the power to investigate potential abuses of women's rights in states that have agreed to an "inquiry procedure". Although such activities are subject to cooperation of the country, the Committee can produce public final reports and call for pressure for possible reform. (See summary of 1999 Optional Protocol at: <http://www.un.org/womenwatch/daw/cedaw/protocol/>, retrieved 3/6/12.)

As noted by many scholars and United Nations officials alike, CEDAW can ultimately only be enforced by political will and international pressure. What is key to the implementation of CEDAW is the dynamic interplay of global, national, and local forces, including the reform of formal, legal domestic structures such as the language of constitutions, as well as the on-going critical work of non-governmental (NGOs) and grassroots organizations supporting and advocating for women's rights (Zwingel, 2005; Peterson and Runyan, 2010). Our research seeks to add to the knowledge about to what extent the language of constitutions of states in the European Union approaches CEDAW and whether the ranking of these states coincides or mirrors the general rankings of European Union states on indices such as the United Nations HDI and GII.

Table 1: Ratification date of CEDAW for EU countries looked at in this study

Country	Ratification Date
Austria	1982
Belgium	1985
Bulgaria	1982
Cyprus	1985
Czech Republic	1993
Denmark	1983
Estonia	1991
Finland	1986
France	1983
Germany	1985
Greece	1983
Hungary	1980
Ireland	1985
Italy	1985
Latvia	1992
Lithuania	1994
Luxembourg	1989
Malta	1991
Netherlands	1991
Poland	1980
Portugal	1980
Romania	1982
Slovakia	1993
Slovenia	1992
Spain	1984
Sweden	1980

Given our regional focus is on European Union states, some background on the relationship between CEDAW and the member states of the EU is useful. As shown in Table 1, all 26 members of the European Union examined in this study are Parties to CEDAW; Hungary, Poland, Portugal, and Sweden ratified the Convention as soon as it was opened for signature in 1980. The remaining Central and East European states, who are now also members of the EU, joined after the fall of communism in the 1990s. Most of the EU states, except for Estonia, Latvia and Malta are also Parties to the Optional Protocol. Although the United Kingdom does not have a formal constitutional document, it does have a series of parliamentary acts or amendments; the United Kingdom ratified CEDAW in 1986 (<http://www.un.org/womenwatch/daw/cedaw/states.htm>).

In December 2009, when the Lisbon Treaty of the European Union entered into force, the European Union became a full legal entity, "separate from and superior to its Members States" (Neubauer, 2011:18). This meant that the European Union now had the capacity to negotiate and to ratify international treaties on behalf of its members. The EU recently exercised this ability in January 2011 by becoming a party to the new United Nations Convention on the Rights of People with Disabilities. Experts from feminist organizations such as Women in Development Europe (WIDE) and within the EU bureaucracy itself believe that the EU should initiate a process for full ratification of CEDAW at the European Union level, arguing that the standards of CEDAW "should be considered as an obligation of the Union in general" (Neubauer, 2011:19; see also the WIDE CEDAW+30 Campaign at: <http://www.wide-network.org/index.jsp?id=541>). Knowing to what degree the current language of constitutions of EU member states approaches CEDAW would be helpful in understanding what the next legal and formal constitutional steps should be for states in seeking compliance with CEDAW.

### **Research on CEDAW and Discussion in the Academic Literature**

Studies of political, social, and economic issues facing women and girls in various parts of the world can be found in the United Nations reports gathered by the United Nations Commission on the Status of Women. These reports describe general legislative initiatives or development programs in states related to the empowerment of women and girls. For example, the Commission has focused on critical areas of the United Nations Beijing Platform for Action with recent conclusions noting the continuing common challenges of increasing political participation of women in decision-making processes, increasing human and financial resources to support women, and the persistence of gender stereotypes (see for example, Report from the United Nations Department of Economic and Social Affairs, 2010).

However, as noted above, the Committee on the Elimination of All Forms of Discrimination Against Women is the main monitoring body for CEDAW and has provided individual reports on the status of women's political rights in states. At each of its meetings, the Committee examines national reports submitted by state representatives within one year of ratification or accession. After that, a country is asked for a written report every four years. In conversations with these officials,

the CEDAW experts obtain additional information as needed. Recommendations are then made by the committee on what else a state should do to promote anti-discrimination policies. The reports are country specific and usually do not draw comparisons from region to region, and are not necessarily correlated with other indexes such as the United Nations HDI or GII (<http://www.un.org/womenwatch/daw/cedaw/committee.htm>, extracted 2/13/12).

Many other international organizations, non-government organizations (NGOs), and research centers beyond the United Nations generate statements and reports on CEDAW and its impact from year to year. For example, the recent publication of the International Center for Research on Women describes concrete examples regarding how CEDAW has made a positive difference in women's lives (Warner, 2010). Gathering information from the experiences of women in Afghanistan, Ghana, Mexico, Sierra Leone, Tanzania, Turkey, and Uganda, this report gives an overview of where CEDAW has made a difference in areas of increasing women's political participation, protecting women against violence and trafficking, improving women's economic opportunities, and advancing human rights. The European Parliament of the European Union regularly requests reports on gender equality (see Neubauer, 2011). The Council of Europe also recently released its January 2012 report on advancing women's rights in Europe, reviewing the status of compliance of European States with CEDAW (Err, 2012; <http://assembly.coe.int/Documents/WorkingDocs/Doc12/EDOC12812.pdf>). Women's International Network (WIN) News also publishes short updates or reports on activities related to the status of women and rights of women globally (<http://www.feminist.com/win>).

While numerous reports by various international organizations and transnational networks exist on the impact of CEDAW, academic scholarship on CEDAW in political science generally, and international relations in particular, has been somewhat sparse. Within the last decade, academic debates have focused on why states ratify CEDAW or not (Smith, 2006); the need to develop theoretical frameworks to understand global norm diffusion and to what extent international standards, as defined in treaties or conventions such as CEDAW, are a process of global, national, and local discourses and practices (Zwingel, 2009; Zwingel, 2005); and approaches to defining women's empowerment, analyzing policy, and understanding the impact of CEDAW on women's public and private lives (Den

Boer, 2008; Vohra-Gupta, 2010; see also Peterson and Runyon, 2010). Yet gaps in this literature exist when it comes to examining the approximation of language of constitutions to CEDAW, and attempting to compare regionally how close constitutions come to the language of CEDAW provisions or addressing the inequality of women.

Feminist international law literature has perhaps contributed most to understanding the role of international instruments such as CEDAW in defining rights. Numerous articles and books have analyzed the gendering of human rights law (Byrnes, 1989; Cook, 1994; Gallagher 1997; Zwingel, 2005). In addition, the literature of international law has also examined the language and mechanisms of accountability and compliance and the role of state constitutions (Li-Ann, 1997; Simmons, 2004).

The academic literature on CEDAW and its implementation within the European Union has focused on the general role of international organizations and transnational networks in promoting women's rights (Pollack and Hefner-Burton, 2000; Montoya, 2009); the interpretation of CEDAW's provisions dealing with violence against women (Montoya, 2009), in particular the scope of the convention and issues of domestic violence; women and labor (Holtmaat, 2002); and changing social patterns (Cho, 2010). Interestingly enough, even though all European Union countries have ratified CEDAW, no scholarship has compared the constitutions of European Union members to measure to what degree the language of the constitutions reflects the provisions of CEDAW. Our study attempts to fill a gap in the existing academic literature both by exploring the usefulness of automated content analysis and by looking at the extent that European states have approached the language of CEDAW in their constitutions.

## **Data**

We use constitutions obtained from the Constitution Finders database ([constitution.richmond.edu](http://constitution.richmond.edu)). Table 1 shows the list of countries constitutions used in this study. Each constitution contains on average 16,650 words with a maximum of 48,978 (Cyprus) and a minimum of 8,812 (Czech Republic). Of those 16,650 words there is on average 1,741 unique content words.



We use the English version of CEDAW as published as by the United Nations (<http://www.un.org/womenwatch/daw/cedaw/text/econvention.htm>). In particular, we are interested in to what degree language approaches Articles 7 and 8 of CEDAW (see Appendix I). These two articles deal specifically with women's equality and the need to eliminate discrimination in political and public life.

## Methods

In their introduction to a special issue of *Political Analysis*, Monroe and Schrodt (2008) noted that text can be an important 'artifact of political behavior'. With recent developments in the availability of documents on-line and computer programming technology, automated content analysis, as a methodology that can be applied in political science research, has become more feasible. Recent uses of such methodology can be seen in the work by Habashi, Driskill, Lang, and DeFalco (2010); Grimmer, 2008; and Laver, Michael, et. al., 2003. Wesley (2010) cautions though that using quantitative as well as qualitative methods to content analysis requires attention to the authenticity or believability of the interpretation of a document, and impartiality of the analysis.

Our quantitative method consists of three steps. In the first step, we extract *ngram* features from CEDAW specifically unigrams, bigrams and trigrams. Ngrams are defined as a contiguous sequence of N content words that occur in some proximity to each other in a document. For example, consider the phrase:

*Among the international human rights treaties*

The unigrams in this phrase are: *among, international, human, rights* and *treaties*. The bigrams, an ordered sequence of two words, are: *international human, human rights*, and *rights treaties*. Notice that *among the* is not considered a bigram in this example because it contains the non-content word *the*. The trigrams, an ordered sequence of three words, are *international human rights* and *human rights treaties*. We use these ngrams as features representing the general content of CEDAW as well as the specific Articles of 7 and 8.

In the second step, we create a feature vector for each constitution based on the ngrams extracted from CEDAW where each element in the vector is either a 0 or the length of the ngram depending whether the feature exists in the constitution.

We use the length of the ngram in order to weight longer ngram matches higher than shorter ones. Figure 1 shows the vector using a toy example consisting of the ngram features from above and a “constitution” consisting of the phrase: *conformity with the international declaration of human rights*.

Figure 1: Feature Vectors for CEDAW and Constitution

Feature	CEDAW Vector	Constitution Vector
Among	1	0
International	1	1
Human	1	1
Rights	1	1
Treaties	1	0
international human	2	0
human rights	2	2
rights treaties	2	0
international human rights	3	0
human rights treaties	3	0

In the third step, we compare each constitutions vector with the CEDAW vector using the cosine similarity measure. Cosine similarity measures the degree of similarity between two vectors by calculating the angle between them. The closer the angle the more similar the two documents are. The measure is formally defined as:

$$\text{similarity}(A, B) = \cos \frac{A \cdot B}{\|A\| \|B\|}$$

We then rank the constitutions based on their cosine similarity scores; a higher cosine similarity scores indicates a greater use of CEDAW terminology in the constitution.

Using feature vectors to represent documents has a long history in information retrieval and Natural Language Processing (Turney and Pantel, 2010). They were first used by Salton (1971) in document retrieval to rank a set of documents based on a user’s query. In this method, a vector was created for each document and the users query. The documents were ranked based on their similarity score and presented to the user. The cosine similarity score between a

document's vector and the vector of the users query indicated the relevance of a document to the query.

This type of method has been extended and applied to document clustering (Manning et al, 2008), document classification (Manning et al, 2008) and document routing (Chu-carroll and Carpenter, 1999). The underlying assumption in this method is that the vector captures to some degree the meaning of the document.

To verify and understand the results of our quantitative method, we closely read and individually reviewed each of the constitutional documents for 26 out of 27 of the member states (all except the United Kingdom) of the European Union, looking for language on equality, women's rights, and political participation. This close textual reading allowed us to compare the quantitative findings with what we could qualitatively derive from the content, context, and structure of sentences.

## **Findings and Analysis**

CEDAW requires that State Parties embody the principle of equality of men and women in their national constitutions, amendments or formal legislative instruments. The Convention also notes that states should review all area of domestic law to eliminate or amend provisions that are discriminatory in purpose or in practice (<http://www.un.org/womenwatch/daw/cedaw/text/econvention.htm>). Articles 7 and 8 specifically deal with eliminating discrimination against women in political and public life; and, allowing women, on equal terms with men, the opportunity to represent their governments at the international level (See text of CEDAW, Part II, Articles 7 and 8 in Appendix I). We would expect that if states have ratified CEDAW and fully implemented its requirements that their most recent constitutions would contain wording similar to that of the provisions of CEDAW.

Table 2 shows the cosine similarity scores between the constitutions of the EU countries in comparison with Part II, Articles 7 and 8 of the Convention and the Convention overall; a similarity score of 1 represents the greatest degree of similarity and 0 being the least.

Table 2: Similarity scores of EU Member State Constitutions compared to CEDAW

Country	CEDAW	CEDAW Article 7	CEDAW Article 8	CEDAW Article 7 & 8
Italy	0.24	<b>0.58</b>	0.55	<b>0.56</b>
Romania	0.24	0.5	0.68	<b>0.56</b>
Hungary	0.24	0.49	<b>0.69</b>	<b>0.56</b>
Poland	0.25	0.53	0.6	0.55
Greece	0.27	0.52	0.6	0.54
Portugal	<b>0.29</b>	0.5	0.54	0.53
Spain	0.26	0.46	0.66	0.53
Slovenia	0.23	0.5	0.52	0.51
Cyprus	0.28	0.49	0.59	0.51
Germany	0.27	0.49	0.56	0.51
Bulgaria	0.24	0.48	0.56	0.5
Lithuania	0.22	0.46	0.55	0.49
Austria	0.25	0.46	0.53	0.48
Slovakia	0.25	0.46	0.55	0.48
Netherlands	0.21	0.45	0.45	0.47
France	0.23	0.44	0.53	0.46
Sweden	0.23	0.43	0.56	0.46
Finland	0.21	0.43	0.48	0.43
Belgium	0.23	0.41	0.47	0.43
Ireland	0.22	0.39	0.49	0.42
Denmark	0.22	0.41	0.43	0.41
Estonia	0.19	0.38	0.45	0.39
Czech Republic	0.19	0.36	0.45	0.39
Luxembourg	0.19	0.36	0.43	0.38
Latvia	0.15	0.36	0.43	0.37
Malta	0.14	0.37	0.33	0.36
<b>AVERAGE</b>	<b>0.23</b>	<b>0.45</b>	<b>0.53</b>	<b>0.46</b>

Our results show that overall the constitutions have a higher degree of similarity with Article 8 (with an average score of 0.53) than Article 7 (with an average score of 0.45). We believe that this is because Article 7 contains more complex norms, and in some countries, relatively more difficult provisions to include in constitutional language. For example, to overcome discrimination and to ensure that women hold political office in equal numbers to men may require some states to implement quota systems, or mandate other methods of making sure that women gain full access to the formulation and implementation of public policy. States may be hesitant to include specific language in the constitution that pushes them to implement CEDAW in this way.

When compared with both Articles 7 and 8, the results show that states ranged from Malta with the lowest score of 0.36 to Hungary, Italy, and Romania with the highest score of .56. Looking at results only for Article 7 reveals too that Malta has a low score of .37, along with low scores of .36 for states such as Luxembourg, Latvia, and the Czech Republic. Meanwhile, the states of Sweden, Netherlands, and Finland have middle range scores with Italy having the highest score at .58. These results coincide with observations by the CEDAW committee, the Council of Europe, and the EU reports that observe full implementation of CEDAW remains elusive, and gender inequality in the political sphere still exists, even in what would otherwise might be considered the most progressive of EU states, such as Sweden, Denmark and the Netherlands.

Analysis of the constitutions from Malta (low scores) to Hungary, Italy, and the Netherlands (higher scores) show that Hungary, Italy, and the Netherlands make explicit equal rights for men and women. For example, the word *equal* occurs six times in Hungary's constitution with the word *equality* occurring twice. Similarly, the word *equal* and *equally* occur twice in the Netherland's constitution with the word *equality* occurring once. Whereas, in Malta's constitution uses phrases such as *person's shall*' but does not make explicit notions of equality. The word *equal* occurs twice with no other form of the word occurring. The lack of overlap between the ngrams in the constitution and the CEDAW reduces Malta's similarity score. Table 3 shows the ngram features found in both CEDAW Section 7 and 8, and Hungary's, Italy's and Malta's constitutions respectively. These results show that both Hungary and Italy contain a greater number of features obtained from CEDAW Sections 7 and 8, and the features are more indicative of the treaty than those found in Malta's constitution.

Table 3: Features identified in CEDAW Articles 7 and 8 for the constitutions of Hungary, Italy, Malta, and Netherlands

Feature	Hungry	Italy	Malta
8	X	X	X
Any	X	X	X
any discrimination	X		
Appropriate		X	X
Article	X	X	X
article 8	X		
Discrimination	X		
Ensure	X	X	X
Equal	X	X	X

equal terms		X	
Governments	X		
International	X	X	
Level	X	X	
Measures	X	X	
Men	X	X	
Opportunity	X		X
Participate	X	X	
Parties	X	X	X
parties shall	X	X	
Represent	X	X	
Shall	X	X	X
shall take	X	X	
States	X	X	
Take	X	X	X
Terms	X	X	X
Without	X	X	X
without any	X		
without any discrimination	X		
Women	X	X	
Work	X	X	

We compared our results with the HDI, GII and % of women in parliament rankings using Spearman's Rank Correlation. Table 4 shows the rankings of the EU countries in comparison with Articles 7 and 8 of CEDAW. The rankings incorporate duplicate scores, for example Italy and Hungary both have a ranking of two when comparing their constitutions to CEDAW Articles 7 and 8 because their similarity scores were equal. The table also contains the percentage of women in parliament, and the score and ranking of the 2011 Human Development Index (HDI) and the Gender Inequality Index (GII).

HDI is a composite index based on the health, education and living standards of individuals in the country. This index is used as a reference for the social and economic development of the country. GII is built on the same framework as HDI but is specific to woman and girls. It is based specifically on the reproductive health, empowerment and labor market for women.

Table 4: Rankings of EU State Constitutions based on their similarity to CEDAW

Country	CEDAW Section 7	CEDAW Section 8	CEDAW Section 7 & 8	% Women Parliament	HDI Score :: Ranking	GII Score :: Ranking
Italy	1	10	2	20.3	0.124 :: 15	0.874 :: 24
Poland	2	4	4	17.9	0.164 :: 25	0.813 :: 39
Greece	3	5	5	17.3	0.162 :: 24	0.861 :: 29
Portugal	4	13	6	27.4	0.140 :: 19	0.809 :: 41
Romania	4	2	1	9.8	0.333 :: 55	0.781 :: 50
Slovenia	6	16	10	10.8	0.175 :: 28	0.884 :: 21
Germany	7	7	8	31.7	0.085 :: 7	0.905 :: 9
Hungry	7	1	2	9.1	0.237 :: 39	0.816 :: 38
Cyprus	9	6	9	12.5	0.141 :: 21	0.84 :: 31
Bulgaria	10	8	11	20.8	0.245 :: 40	0.771 :: 55
Austria	11	14	13	28.3	0.131 :: 16	0.885 :: 19
Lithuania	12	10	12	19.1	0.192 :: 29	0.810 :: 40
Slovakia	12	10	14	16	0.194 :: 31	0.834 :: 35
Spain	12	3	7	34.7	0.117 :: 13	0.878 :: 23
Netherlands	15	20	15	37.8	0.052 :: 2	0.910 :: 3
France	16	14	17	20	0.106 :: 10	0.884 :: 20
Finland	17	18	19	42.5	0.075 :: 5	0.882 :: 22
Sweden	17	8	15	45	0.049 :: 1	0.904 :: 10
Belgium	19	19	18	38.5	0.114 :: 12	0.886 :: 18
Denmark	20	23	20	38	0.060 :: 3	0.895 :: 16
Ireland	21	17	21	11.1	0.203 :: 33	0.908 :: 7
Estonia	22	20	22	19.8	0.194 :: 30	0.835 :: 34
Malta	23	26	26	8.7	0.272 :: 42	0.832 :: 36
Czech Republic	24	20	23	21	0.136 :: 17	0.865 :: 27
Latvia	24	23	25	20	0.216 :: 36	0.805 :: 43

Spearman's measures the statistical dependence between two variables to assesses how well the relationship between the variables can be described using a monotonic function. If the variables are perfectly monotonic, we would expect to see a correlation of 1 or -1. For example, if the rankings of the EU countries obtained by the cosine similarity measure were correlated to that of the rankings obtained by the HDI, a function would exist that given the cosine score ranking it would return the HDI ranking. A positive correlation signifies that as the values of one variable increase, the values of the second variable also increase; a negative correlation signifies that as the values of one variable are increasing the other is decreasing.

Table 5 shows the correlation between the rankings obtained by the cosine measure and the percentage of women in parliament, HDI and GII. The results show that the countries' rankings on CEDAW have no significant correlation with the HDI, GII, or the percentage of women in parliament. The correlation results with HDI show that both sets of values are increasing, which indicates that as there exists a higher degree of similarity between the language in the constitution and CEDAW, there exists a higher HDI assigned to the country; although this correlation is not significant. For the percentage of women in parliament, we see the opposite. As a greater percentage of women in parliament exists, there is a lower degree of similarity between the language in the constitution and CEDAW. Again, though, this correlation is not significant.

Table 5: Spearman's Rank Correlation between EU Countries Rankings and other indicators

	CEDAW Article 7	CEDAW Article 8	CEDAW Articles 7 & 8
HDI Rankings	0.2213	0.2536	0.2424
GII Rankings	0.0301	0.0953	0.0345
% Women Parliament	-0.1954	-0.1989	-0.1807

The correlation results with GII are very close to zero indicating that the relationship between the variables is random. As stated previously, HDI is a composite index based on the health, education and living standards of individuals in the country. GII is an extension of this index directly solely toward women and girls rather than population as a whole. This indicates that the language in the country's constitution does not reflect what is happening on the ground.

Overall, we should note that the HDI and GII are measuring broader forms of inequality and human rights in areas such as development, education, and health. Therefore, a direct correlation between the indices and the language in a constitution may not be possible, especially given the content of Articles 7 and 8. We also need to be careful not to assume that the indices, as well as the % of women in parliament, are telling us the full story on political participation of women. For example, they do not give us an idea of local representation, membership in civil society or NGOs, or measure lobbying activities for example. Women may very well be engaged in political participation in more equal ways through those avenues, but just not in parliament.



Even so, we know simply from the smaller percentages of women in parliament that indeed Article 7 of CEDAW has not been fully implemented since women are not fully represented. Women are not equally and fully participating in the formulation of government policy or its implementation. As noted by Err (2012) in the recent Council of Europe report, to fulfill CEDAW, "Leaders participating in decision-making should be representative since the general interest concerns society as a whole, which is made up of both men and women" (p. 16).

### **Conclusions/Implications**

Our study helps fill the gap in the academic literature on the regional studies of CEDAW and its impact in 26 member states of the European Union. At the same time, we used a relatively new method in political science, automated content analysis, to rank states in this region on the use of CEDAW's language in their constitutions and to identify important information on the political rights of women.

Our methodology does have some limitations. First, we were only able to look at constitutions in the region after states' ratification of CEDAW or post-1980. Difficulties in finding complete copies of constitutions for all European Union member states, or copies in English translation prior to CEDAW, prevented a study that might show changes in language within constitutions before and after the ratification of CEDAW. We only looked at the most recent constitutions of the European Union member states as of 2011. If more historical, comparative documentation could be gathered, an additional study of the degree of changes within constitutional language regarding women's political rights would be useful.

Next, the vectors used in this study are first-order vectors which require an exact match between the ngram features in the vectors and the language in the constitution. For example, if the term "equal opportunity for women" existed in the constitution, unless that exact wording was used in CEDAW, this method would not capture that. In the future, we would like to look at ways to "loosen up" this restriction by using second-order vectors which take into account the context in which the feature occurs, not just the feature itself. This would allow for a greater degree of language variation to be captured by the method.

Analysis of the ngram features in the vectors showed that very few trigrams and 4grams obtained from CEDAW existed in the constitutions. The ngrams used in this work consisted of contiguous sequences of words. Therefore, *woman's equality* and *equality of women* are considered two different ngrams. In the future, we would like to expand this to allow for *windowing* which would include non-contiguous ngrams within a specified window size. For example, equality of women would render the ngram *equality women*. We would then be able to obtain more nuanced and detailed results.

Even with these limitations, we were able to explore the degree to which the language of constitutions overlaps with that of CEDAW generally, and in Part II, Articles 7 and 8 in particular. We were also able to show the rankings of these European Union member states compared to each other. Our results do complement many other United Nations, European Union, and Council of Europe reports that show even if a state makes explicit notions of equal treatment and anti-discrimination in its constitution as per CEDAW, this language still does not necessarily translate into actual representation or full political equality for women, or for that matter, day to day access to human rights. That does not mean that CEDAW does not matter; rather the process of changing values and political practice is complex and on-going. Communicating values and implementing women's empowerment through the formal language of constitutions and electoral systems is only part of that process.

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## **Appendix I**

Article 7: States Parties shall take all appropriate measures to eliminate discrimination against women in the political and public life of the country and, in particular, shall ensure to women, on equal terms with men, the right: (a) To vote in all elections and public referenda and to be eligible for election to all publicly elected bodies; (b) To participate in the formulation of government policy and the implementation thereof and to hold public office and perform all public functions at all levels of government; (c) To participate in non-governmental organizations and associations concerned with the public and political life of the country.

Article 8: States Parties shall take all appropriate measures to ensure to women, on equal terms with men and without any discrimination, the opportunity to represent their Governments at the international level and to participate in the work of international organizations.