

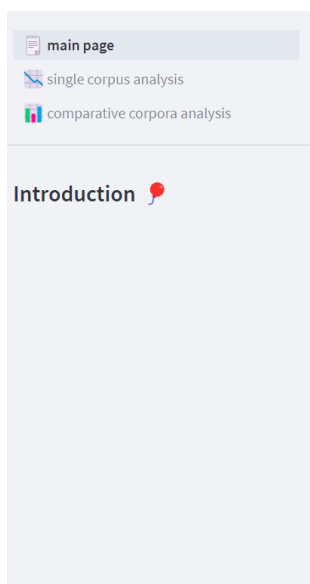
MArgAn: Moral Argument Analytics

User Manual

v. 2023-11

XX

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MArgAn: Moral Argument Analytics

Moral Foundation Detection

Lexicon-Based Method

Definition ▼

Moral Foundation Metrics

Sequence Type (Argumentative Discourse Units or Arguments)

Definition ▼

Moral Foundation Score (Interlocutors)

Definition ▼

Moral Valence Degree (Interlocutors)

Introduction

This manual is crafted to guide users through the basic operations of the MArgAn Interface. Diving into its core, Moral Argument Analytics (MArgAn), as an AI-based argument technology, is designed to systematically explore the moral underpinnings within an argumentative discourse. By detecting moral foundation words and analysing the corresponding moral foundations in the content and structure of arguments, this technology aims to understand the inherent moral foundations shaping argumentation.

Contents

1	Overview to MArgAn: Moral Argument Analytics	3
2	Moral Foundation Metrics	3
2.1	Sequence Type Analysis	3
2.2	Moral Foundation Score (Interlocutors)	3
2.3	Moral Valence Degree (Interlocutors)	3
3	General Structure	3
4	Corpora Operation	5
4.1	Data Description	5
4.2	Single Corpus Analysis	6
4.3	Comparative Corpora Analysis	6
5	Analysis Unit	7
5.1	ADU-Based Analysis	7
5.2	Relation-Based Analysis	8
5.3	Entity-Based Analysis	8
6	Analytics Module	9
6.1	Word Cloud	9
6.1.1	Single Corpus Analysis in ADUs	9
6.1.2	Comparative Corpora Analysis in ADUs	12
6.1.3	Comparative Corpora Analysis in Arguments	14
6.2	Moral Foundation Distribution	15
6.2.1	Single Corpus Analysis in ADUs	15
6.2.2	Comparative Corpora Analysis in ADUs	16
6.2.3	Comparative Corpora Analysis in Arguments	19
6.3	Interlocutors Distribution	20
6.3.1	Single Corpus Analysis in Entities	20
6.3.2	Comparative Corpora Analysis in Entities	23
6.4	Interlocutors Moral Scores	30
6.4.1	Single Corpus Analysis in Entities	30
6.4.2	Comparative Corpora Analysis in Entities	31
6.5	Interlocutors' Argumentation Network	32
6.6	Interlocutors Interaction	33
7	Conclusion	34

1 Overview to MArgAn: Moral Argument Analytics

Welcome to the MArgAn Interface User Manual, your guide to navigating and utilising our advanced visualisation tool built for moral argument analytics. Developed using the Streamlit Library, this tool offers an online visual representation of moral foundations in arguments¹. This manual will walk users through the core features, functionalities, and components to ensure users get the most from our interface.

2 Moral Foundation Metrics

2.1 Sequence Type Analysis

We assess the presence of specific moral foundations within text sequences, utilizing the moral foundation dictionary. Additionally, we've introduced the *No Morals* category to designate sequences that lack moral foundations. We distinguish between 10 moral categories, plus the category *No Morals*, designed for sequences devoid of moral foundations.

2.2 Moral Foundation Score (Interlocutors)

We compute the proportion of sequences that encompass specific moral categories across 10 predefined moral categories to obtain interlocutors' moral foundation score.

2.3 Moral Valence Degree (Interlocutors)

For each moral foundation attributed to an interlocutor within the corpora, we categorise it into one of four moral valence categories. It is important to note that the following explanations provided for the moral valence categories are specifically tailored to the care foundation.

- *only virtue*: Speakers exclusively utilise care virtues in their discourse when referencing the care foundation.
- *only vice*: Speakers solely include care vices when mentioning the care foundation.
- *mixed*: When the care foundation is mentioned, speakers employ both care virtues and vices.
- *no specific moral foundations*: Speakers abstain from integrating the care foundation into their speech in this category.

3 General Structure

A comprehensive analytical framework forms the backbone of the MArgAn interface. The primary components of this framework include:

- **Corpora Selection**: Choose the data that needs to be analysed according to different analysis purposes (*Single Corpus Analysis* vs *Comparative Corpora Analysis*).

¹<https://margan.streamlit.app/>

- **Analysis Unit Selection:** Decide on the aspect of analysis, such as Argumentative Discourse Units (*ADU-Based*), Arguments (*Relation-Based*), or Entities (*Entity-Based*).
- **Analytics Module Selection:** Pick from various functionalities to analyse data within different analysis aspects (analysis units).

Users can refer to the interface structure in the provided diagram (Figure 1) which offers a detailed visual representation of these components and their interrelations. In the designed interface, the left-hand sidebar (as illustrated in Figure 2) serves as the main navigation component, providing an overview of the interface's general structure.

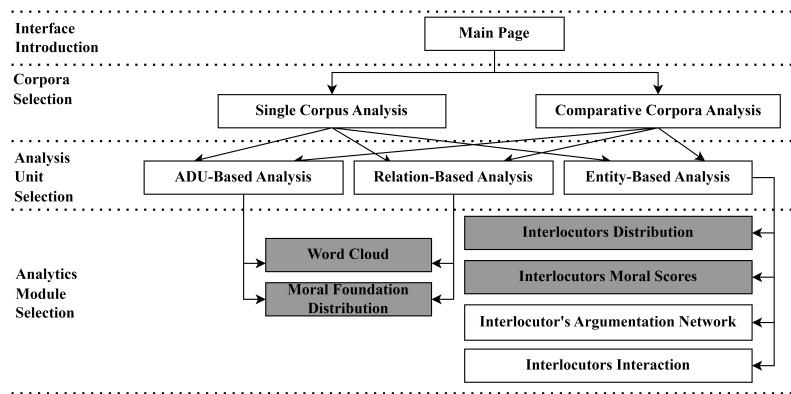


Figure 1: Interface Structure. (Note: In the *Comparative Corpora Analysis*, all the active modules are visually distinguished by being highlighted in grey. On the other hand, the *Single Corpus Analysis* enables all available modules.)

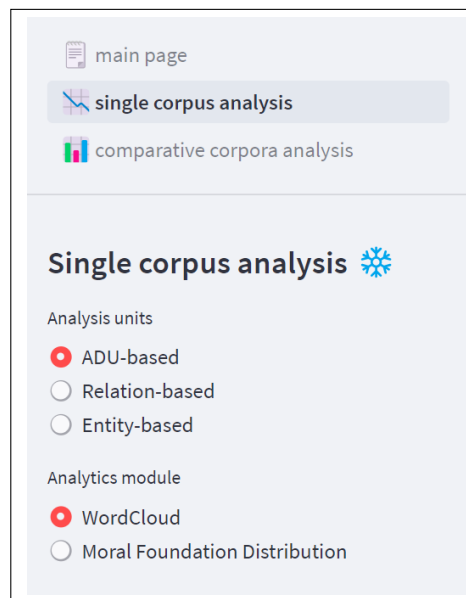


Figure 2: Interface Sidebar

The following section can provide a deep dive into the fundamental components of our interface, which are pivotal for understanding the MArgAn interface. To offer a streamlined experience, we'll delve into the specifics of **Corpora Operation**, **Analysis Unit Selection**, and **Analytics Module Selection**.

4 Corpora Operation

4.1 Data Description

Before embarking on the analysis task, it's crucial to understand the argument-structured corpora we provide in the system.

- *Hansard*² (Offline dialogue) [Duthie et al. (2016)]: transcripts of UK parliamentary debate from the House of Commons and House of Lords.
- *Moral Maze* (Offline dialogue) [Budzynska et al. (2015)]: transcripts from the "Moral Maze" Radio 4 programme, discussing various moral and ethical issues across diverse genres, including *British Empire*, *DDay*, *Morality of Money*, *Morality of Hypocrisy*, and *Welfare State*.
- *US2016TV*³ (Offline dialogue) [Visser et al. (2020)]: transcripts from the 2016 U.S. presidential debates, encompassing Republican, Democratic, and general election debates.
- *Polaris1* (Online dialogue): Reddit discussions on COVID-19 vaccine conspiracy theories from the "r/conspiracy" subreddit.
- *US2016reddit*⁴ (Online dialogue) [Visser et al. (2020)]: Reddit users' responses to the U.S. Presidential TV Debates including Democratic and Republican primaries and the general election debates.

Table 1: Statistic summary of words, ADUs, and speakers in the corpora

Mode	Corpora	Words	ADUs*	Speakers
Offline dialogue	Hansard	87,462	1,014	254
	Moral Maze	38,497	2,220	91
	US2016tv	51,019	4,354	66
Online dialogue	Polaris1	28,491	2,724	475
	US2016reddit	34,595	3,882	1,253
Total		240,064	14,194	2,139

* ADUs: Argumentative discourse units

²<http://hansard.millbanksystems.com/>

³<http://corpora.aifdb.org/US2016tv>

⁴<http://corpora.aifdb.org/US2016reddit>

Table 2: Statistics of Propositional Relations: Distribution of Supports and Attacks in Arguments

Mode	Corpora	Propositional relations	Supports	Attacks
Offline dialogue	Hansard	1,163	839	324
	Moral Maze	1,146	967	179
	US2016tv	2,137	1,929	208
Online dialogue	Polaris1	2,172	1,473	699
	US2016reddit	2,198	1,535	663
Total		8,816	6,743	2,073

The analysis builds upon argumentation annotations of five corpora using the Inference Anchoring Theory (IAT) Budzynska and Reed (2011), specifically examining two fundamental logical relations: *Support* and *Attack*, which correspond to *Inference* and *Conflict* in IAT annotation. Detailed statistical descriptions related to IAT annotation can be found in Table 1 and Table 2.

4.2 Single Corpus Analysis

Users can opt between a single or multiple corpora from the corpora series. When multiple corpora are chosen, they are accumulated to facilitate topic-agnostic moral foundation analytics. For example, Figure 3 illustrates the selection of *Polaris1* and *US2016reddit*, which are merged into a single dataset. Users can customise the dataset name by entering it in the text box.

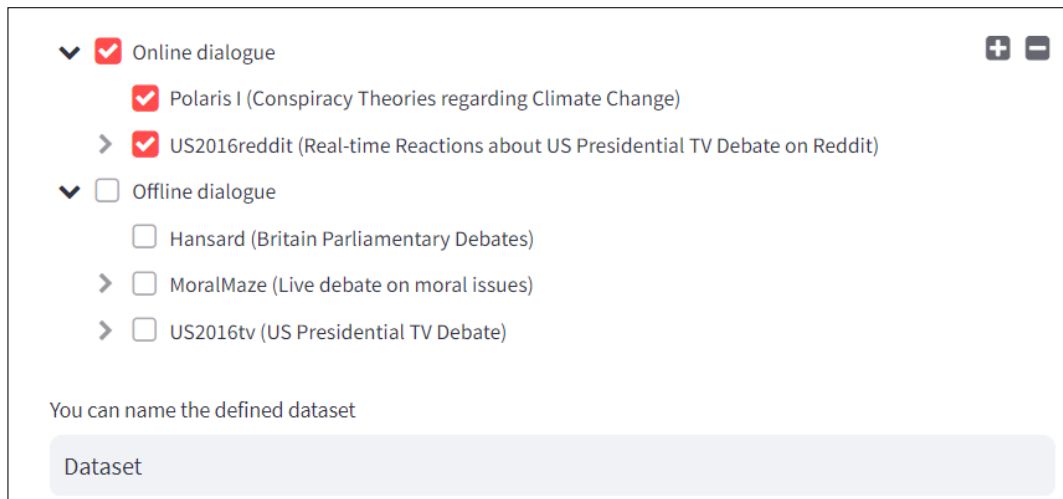


Figure 3: Corpora Selection in *Single Corpus Analysis*

4.3 Comparative Corpora Analysis

Comparative Corpora Analysis is specifically designed for conducting contrasting studies. MArgAn enables comparisons between five predefined datasets, created by various combinations of the five provided datasets. For instance, as shown in Figure 4, two datasets are enabled for comparison. *Dataset1* is composed of all online dialogues, while *Dataset2*

includes all offline dialogues. To enhance the user experience in analysis, each constructed dataset (e.g., *Dataset1*) can be given a customised name to suit individual user preferences.

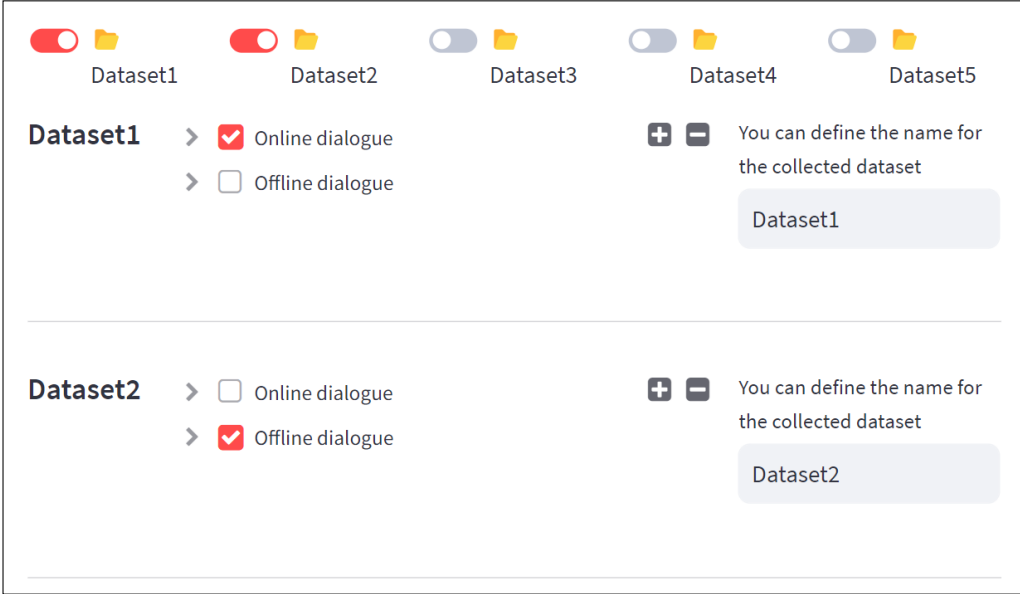


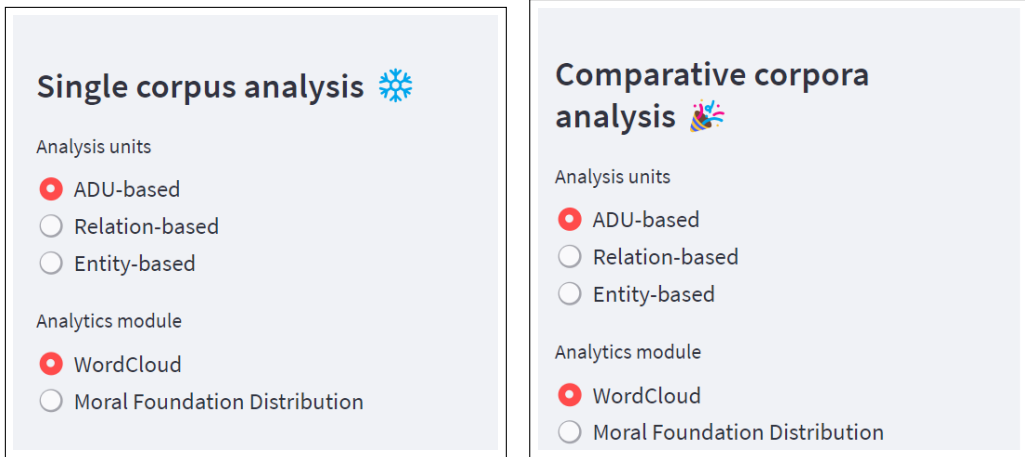
Figure 4: Corpora Selection in *Comparative Corpora Analysis*

5 Analysis Unit

Analysis units refer to the specific objects or elements on which an analysis task is performed. Analysis units can vary depending on the data structure and the analysis objective. Our platform offers multiple analysis units to scrutinise the data.

5.1 ADU-Based Analysis

ADU-Based Analysis engages with all locutions from the selected corpora, adhering to the argumentation discourse units' segmentation. To access the *ADU-based Analysis* in the interface, please refer to Figure 5 for more instructions, including (a) for *Single Corpus Analysis* and (b) for *Comparative Corpora Analysis*.

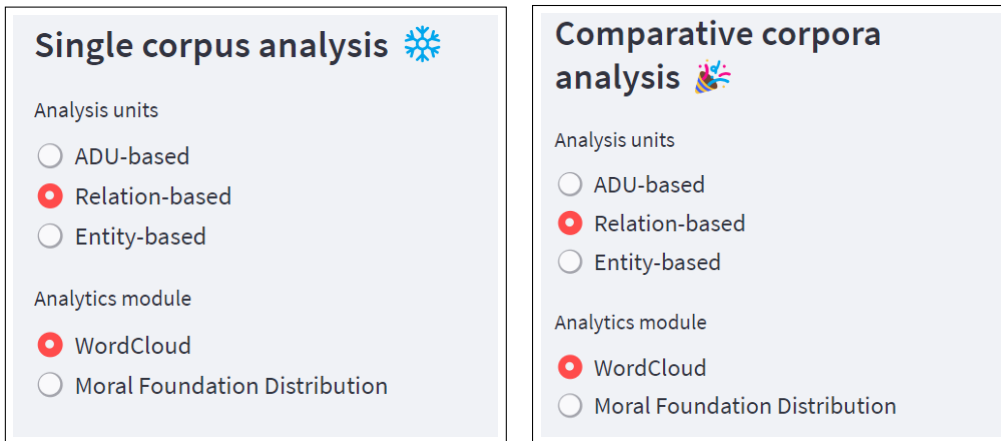


(a) ADU-Based Single Corpus Analysis (b) ADU-Based Comparative Corpora Analysis

Figure 5: ADU-Based Navigation Menu

5.2 Relation-Based Analysis

Relation-Based Analysis primarily focuses on the analysis of moral foundations within arguments. This approach enables the scrutiny of arguments based on specific argument properties, such as *supports* and *attacks*, which may arise from either the *same speaker* or *different speakers*. To access the *Relation-Based Analysis* in the interface, please refer to Figure 6 for more instructions, including (a) for *Single Corpus Analysis* and (b) for *Comparative Corpora Analysis*.



(a) Relation-Based Single Corpus Analysis (b) Relation-Based Comparative Corpora Analysis

Figure 6: Relation-Based Navigation Menu

5.3 Entity-Based Analysis

Entity-Based Analysis analyses the debate’s speakers. It dives deep into understanding their moral foundation orientations and witnesses how these foundations shape the entire discourse’s structure. To access the *Entity-Based Analysis* in the interface, please refer to Figure

7 for more instructions, including (a) for *Single Corpus Analysis* and (b) for *Comparative Corpora Analysis*.

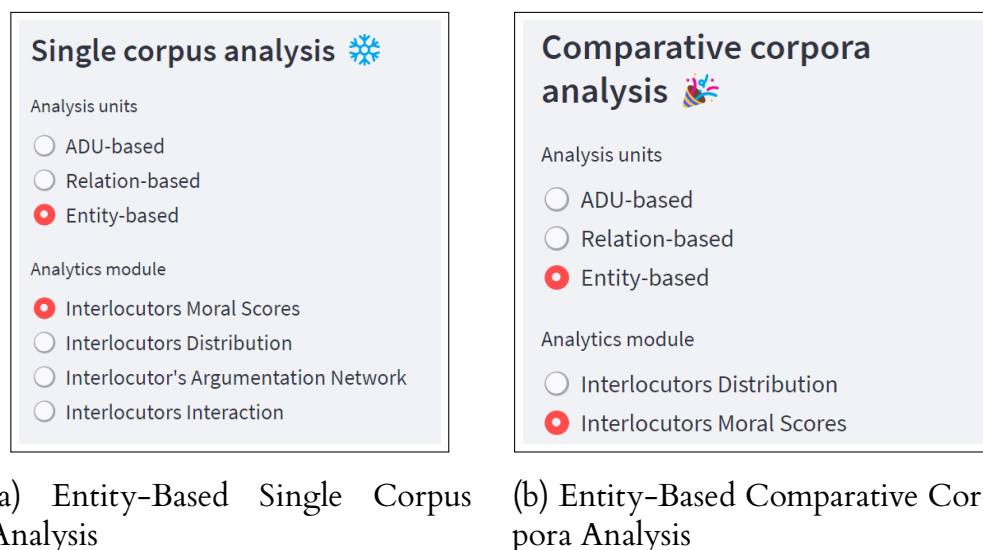


Figure 7: Entity-Based Navigation Menu

6 Analytics Module

The analytics module is where the magic happens. It's designed to bring forth the underlying patterns, insights, and intricacies within the selected corpora.

6.1 Word Cloud

Word Cloud module operates on moral foundation words, accompanied by both quantitative and qualitative insights. This module is linked with both *ADU-Based Analysis* and *Relation-Based Analysis* features, applicable in both *Single Corpus Analysis* and *Comparative Corpora Analysis* functionalities. Considering the structural similarities between the *Word Cloud* modules in both *ADU-Based Analysis* and *Relation-Based Analysis*, we will provide navigation instructions for analysing ADUs using *Word Cloud* module within the context of *Single Corpus Analysis* and *Comparative Corpora Analysis*. Additionally, we will offer guidance on analysing arguments using *Word Cloud* module specifically within the context of *Comparative Corpora Analysis*.

6.1.1 Single Corpus Analysis in ADUs

Word Cloud module encompasses three integral components for analysing ADUs under the context of *Single Corpus Analysis*: (1) *Word Cloud Display* (displaying moral foundation words), (2) *Moral Foundation Words Frequency* (visualising top 10 moral foundation words) and (3) *Qualitative Analysis* (presenting ADUs with moral foundation words).

In order to enable different analysis components, users need to configure different ADU properties to define the data scope and determine the moral foundation and moral valence for moral foundation analysis. For instance, in Figure 8, users can choose whether the discourse units are argumentative or not. If ADUs in arguments are selected, users can further specify whether these ADUs contribute to support or attack relations in argumentation structures

and whether they serve as input or output in argumentation structures. Additionally, users should also select the moral foundation and moral valence fields for word cloud visualisation to tailor the analysis to users' specific needs.

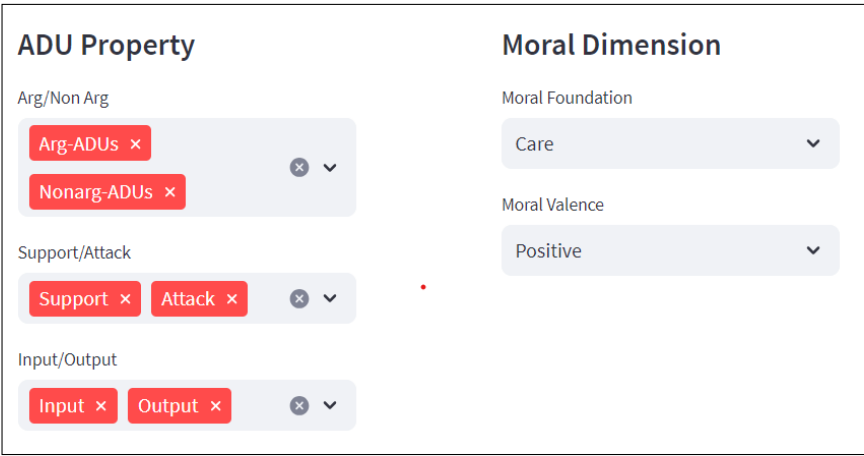


Figure 8: *Word Cloud Module: Overall Navigation Menu (ADU-Based Single Corpus Analysis)*

Word Cloud Display: This feature visualises moral foundation words based on the ADU property configuration and Moral Dimension Setting. The resulting word cloud is similar to Figure 9.

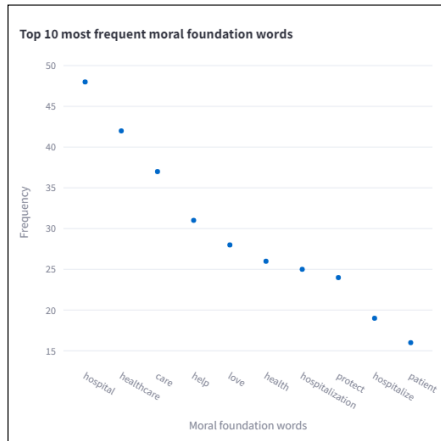


Figure 9: *Word Cloud Module: Example of Word Cloud Visualisation (ADU-Based Single Corpus Analysis)*

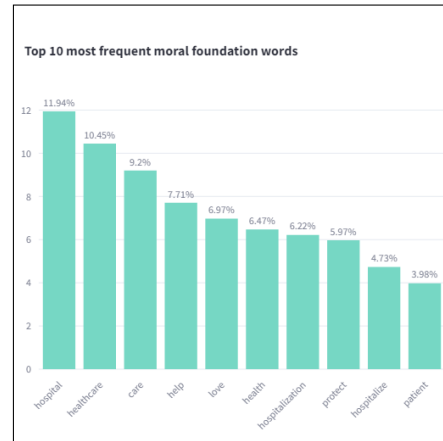
Word Frequency Analysis: It visualises the top 15 moral foundation word frequencies associated with a chosen moral foundation and valence within the selected corpus. Visualisation options include both a graphic visualisation and a numerical table, switchable via tab selection. For graphic visualisation, users can toggle between absolute number and percentage views for different y-axis scales (see Figure 10). As a result, Figure 11 displays an example of the word frequency of the top 10 *care+* moral foundation words and their percentages, calculated based on the total frequency of *care+* moral foundation words.



Figure 10: *Word Cloud* Module: Navigation Menu for Quantitative Analysis Component (*ADU-Based Single Corpus Analysis*)



(a) Number of Top 10 Moral Foundation Words Given the Selected Moral Category Care+



(b) Percentage of Top 10 Moral Foundation Words Given the Moral Category Care+

Figure 11: *Word Cloud* Module: Demonstration of Quantitative Analysis Component (*ADU-Based Single Corpus Analysis*)

Qualitative Analysis: It exhibits text segments containing the specified moral foundation words, as initially pinpointed in the *Word Cloud Display*. Users can display segments given specific word selection using the "single" option and pick the moral foundation words from the dropdown list (refer to Figure 12) or view all segments with all words that fall into a given selected moral foundation category directly with the "all" option (refer to Figure 13).

2. Qualitative Analysis

Choose the number of care+ words you want to select

single
 all

Choose care+ words you want to analyse

benefit

	Text	MF words
0	BollockChop . : The additional resources should be focused on those with the potential to benefit society most	benefit
1	HolidayOk4857 . : you're already dead when the benefits go to your beneficiaries	benefit

Figure 12: *Word Cloud* Module: Navigation Menu for Qualitative Analysis Component Regarding the “single” Option (*ADU-Based Single Corpus Analysis*)

2. Qualitative Analysis

Choose the number of care+ words you want to select

single
 all

	Text	MF words
0	jah seventeen : My mother had severe rheumatoid arthritis	mother
1	Ayers from the paper : My mother had severe rheumatoid arthritis	mother

Figure 13: *Word Cloud* Module: Navigation Menu for Qualitative Analysis Component Regarding the “all” Option (*ADU-Based Single Corpus Analysis*)

6.1.2 Comparative Corpora Analysis in ADUs

Word Cloud module in *Comparative Corpora Analysis* explores the similarities and differences between various constructed corpora (at most 5 corpora) regarding moral foundation words coverage. Similarly, in order to activate the functionality, users need to configure different ADU properties and determine the moral foundation and moral valence (see Figure 8). Following the configuration, three key features are available to facilitate in-depth analysis:

Shared Word Cloud: It can showcase the overlapping moral foundation words across different corpora using the *Word Cloud* technique (e.g., Figure 14).

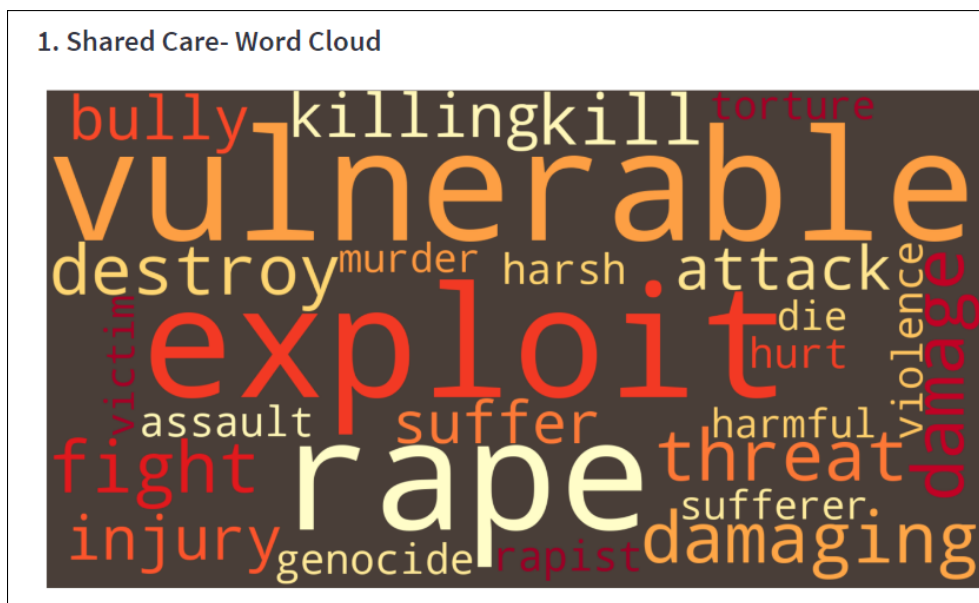


Figure 14: *Word Cloud Module: Example of Shared Moral Foundation Words Cloud (ADU-Based Comparative Corpora Analysis)*

Shared Word Frequency: This feature presents a table displaying the frequency of overlapping moral foundation words across different corpora, as visualised using a word cloud (e.g., see Figure 15). Additionally, this feature provides the total number of shared moral foundation words across different corpora in the end, summarising the displayed moral foundation words in the table.

2. Shared Care- Words Frequency

	Offline 😞	Online 😊	Total
die	19.0	83.0	102.0
fight	74.0	17.0	91.0
attack	30.0	38.0	68.0
kill	16.0	44.0	60.0
threat	29.0	5.0	34.0

Figure 15: *Word Cloud Module: Example of Shared Moral Foundation Words Frequency (ADU-Based Comparative Corpora Analysis)*

Unique Word Frequency: This feature provides a table displaying the frequency of unique moral foundation words across different corpora that do not appear in any other corpora, as illustrated in Figure 16. Additionally, this feature provides the total number of unique moral foundation words for each corpus in the end, summarising the displayed moral foundation words in the table.

	Online 😊
inflict	4.0
ache	3.0
persecution	2.0
stabbing	1.0
ravage	1.0
threatened	1.0
assassination	1.0
punch	1.0
harass	1.0
molester	1.0

Unique Care- Word Frequency (Total) in Online 😊 is 16.0

Figure 16: *Word Cloud Module: Example of Unique Moral Foundation Words Frequency (ADU-Based Comparative Corpora Analysis)*

6.1.3 Comparative Corpora Analysis in Arguments

In general, *Comparative Corpora Analysis* in arguments (*Relation-Based Analysis* under the context of *Comparative Corpora Analysis*) shares the same underlying structure as *Comparative Corpora Analysis in ADUs* (*ADU-Based Analysis* under the context of *Comparative Corpora Analysis*). The primary distinction lies in how users configure the data scope.

In the *Relation-Based Analysis*, the focus shifts from the more fine-grained argumentative structure (input or output) to a broader consideration of different relations among arguments (supports or attacks). This analysis also takes into account whether the arguments are constructed by the same speaker or different speakers, as depicted in the *Argument Property* fields in Figure 17.

Argument Property

Support/Attack

Support ×
Attack ×
× ▾

Arguments constructed by the same speaker/different speakers

Same speaker ×
Different Speakers ×
× ▾

Moral Dimension

Moral Foundation

Care
▾

Moral Valence

Positive
▾

Figure 17: *Word Cloud Module: Overall Navigation Menu (Relation-Based Comparative Corpora Analysis)*

6.2 Moral Foundation Distribution

Moral Foundation Distribution can visualise the distribution of moral foundations in different text units. This module is linked with both *ADU-Based Analysis* and *Relation-Based Analysis* features, applicable in both *Single Corpus Analysis* and *Comparative Corpora Analysis* functionalities. Considering the structural similarities between the *Moral Foundation Distribution* modules in both *ADU-Based Analysis* and *Relation-Based Analysis*, we will provide navigation instructions for analysing ADUs using *Moral Foundation Distribution* module within the context of *Single Corpus Analysis* and *Comparative Corpora Analysis*. Additionally, we will offer guidance on analysing arguments using *Moral Foundation Distribution* module specifically within the context of *Comparative Corpora Analysis*.

6.2.1 Single Corpus Analysis in ADUs

Under the context of *ADU-Based Single Corpus Analysis*, *Moral Foundation Distribution* visualises the distribution of moral foundations in ADUs.

In particular, when navigating through the *ADU-based Single Corpus Analysis*, It allows users to refine their exploration by selecting discourse units (argumentative or non-argumentative), specifying relations (support or attack), and differentiating argument elements (input or output). Furthermore, users have the flexibility to switch between various moral scales to facilitate more detailed investigations of moral foundations. These options encompass four possible moral scales, including moral vs. no morals, two moral valences (virtues as positive morals and vices as negative morals), five moral foundations (care, fairness, loyalty, authority, and sanctity), and ten moral categories (integrating both the virtues and vices associated with each moral foundation, resulting in pairs such as care+, care-, fairness+, fairness-, loyalty+, loyalty-, authority+, authority-, sanctity+, sanctity-). Additionally, users can choose between 'percentage' and 'number' as scaling options for the y-axis. Figure 18 illustrates the navigation menu of *Moral Foundation Distribution* for *Single Corpus Analysis* in ADUs.

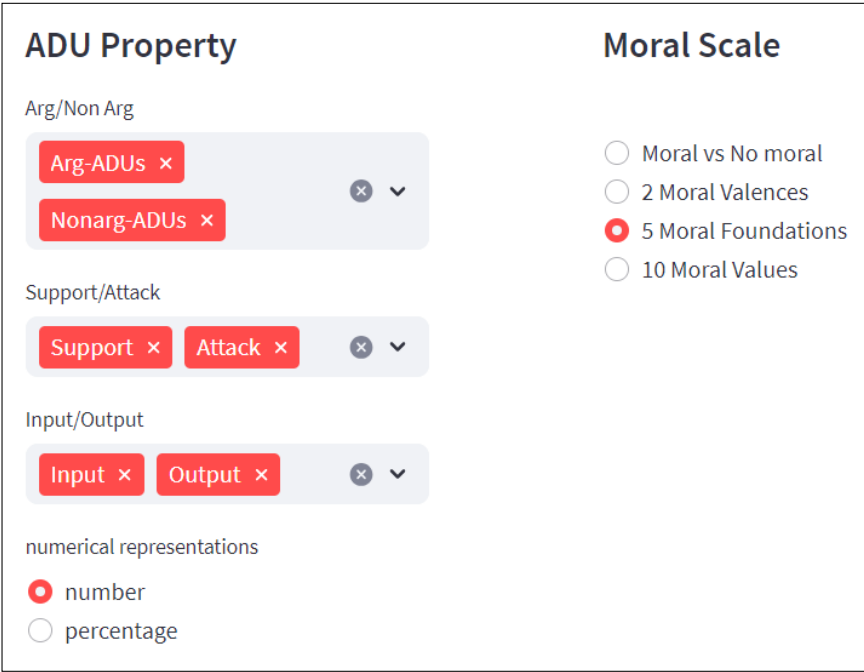


Figure 18: *Moral Foundation Distribution*: Overall Navigation Menu

Subsequent to configuring the menu settings, the *Moral Foundation Distribution* module generates graphic visualisations in the form of bar charts (e.g., refer to Figure 19) and statistical tables (e.g., refer to Figure 20). Users can conveniently access tab options to switch between various data presentation formats to suit their analytical preferences.

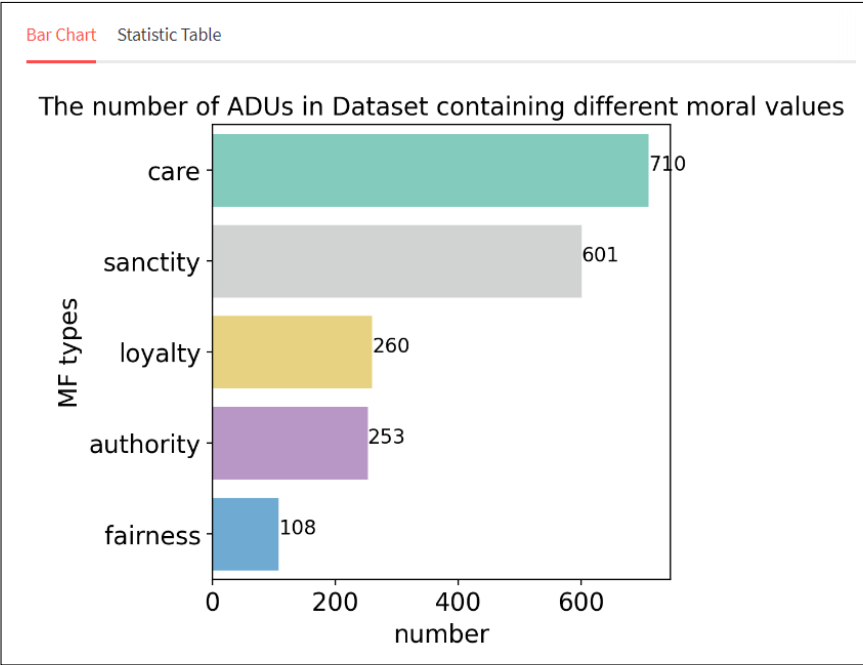


Figure 19: *Moral Foundation Distribution*: Example of Bar Chart Visualisations

	Words Type	Number	Percentage
0	care	1,570	35.84
1	loyalty	1,219	27.83
2	authority	1,130	25.8
3	sanctity	926	21.14
4	fairness	456	10.41

Download data as CSV

Figure 20: *Moral Foundation Distribution*: Example of Statistical Tables

6.2.2 Comparative Corpora Analysis in ADUs

After configuring the settings, the *Moral Foundation Distribution* feature offers three distinct types of data representation: group bar charts, layered bar charts, and statistical tables. Users

can easily switch between these presentation formats using tab selection.

In both group bar charts (refer to Figure 21) and layered bar charts (refer to Figure 22), customisation options are available. Users can tailor the bar chart to their preferences by selecting different y-axis scales (linear or logarithmic), customising colors for various variables, adjusting the figure size, modifying the font size within the figure, and personalising the figure title. Figure 24 provides an illustrative example of layered and group bar charts. For the statistical table, users have the convenience of downloading the table for more user-friendly data manipulation and analysis (see Figure 23).

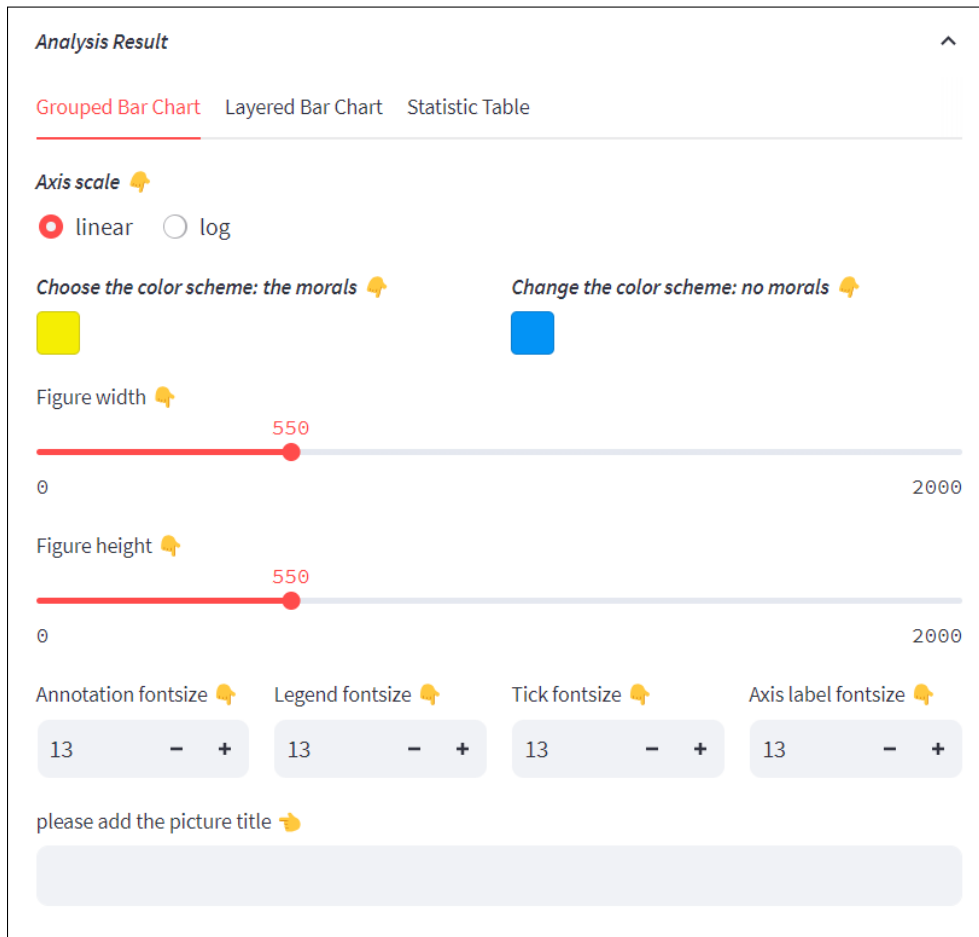


Figure 21: *Moral Foundation Distribution*: Customisation Menu for Group Bar Charts (ADU-Based Comparative Corpora Analysis)

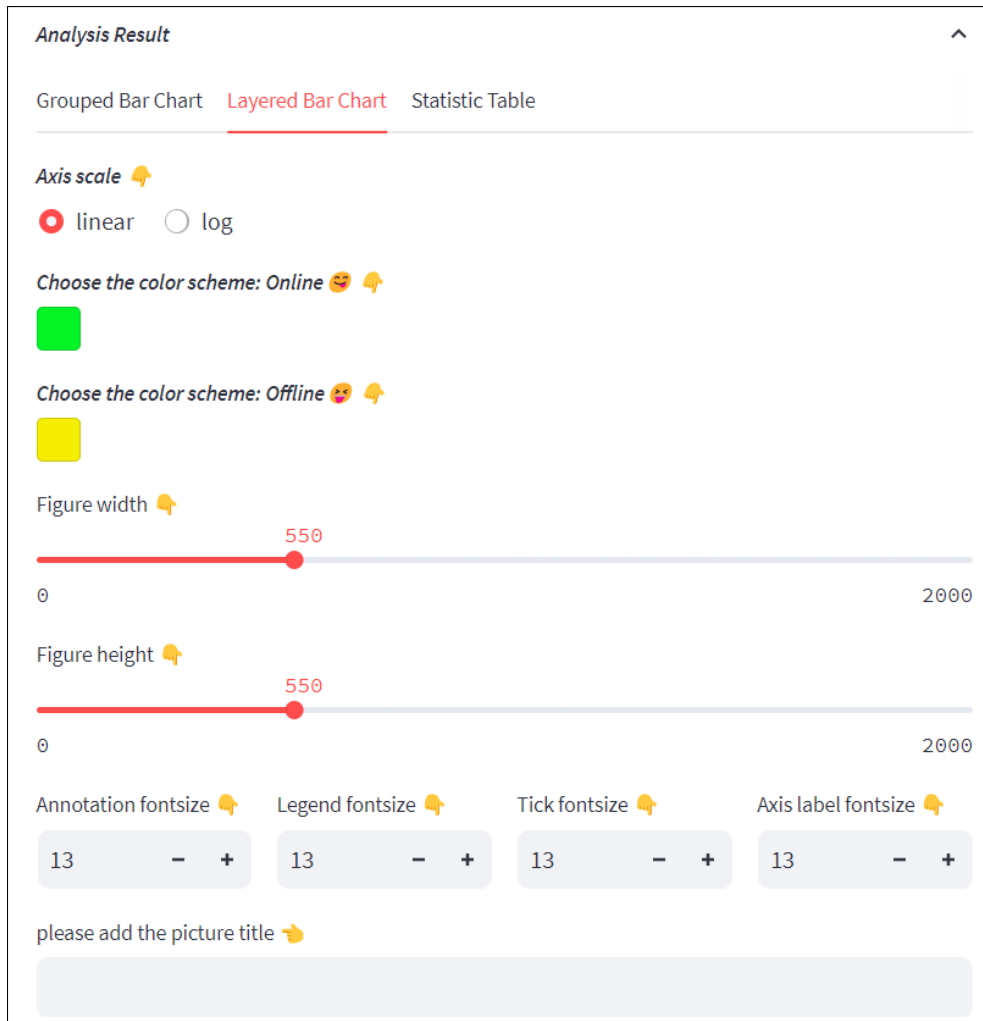


Figure 22: *Moral Foundation Distribution*: Customisation Menu for Layered Bar Charts (ADU-Based Comparative Corpora Analysis)

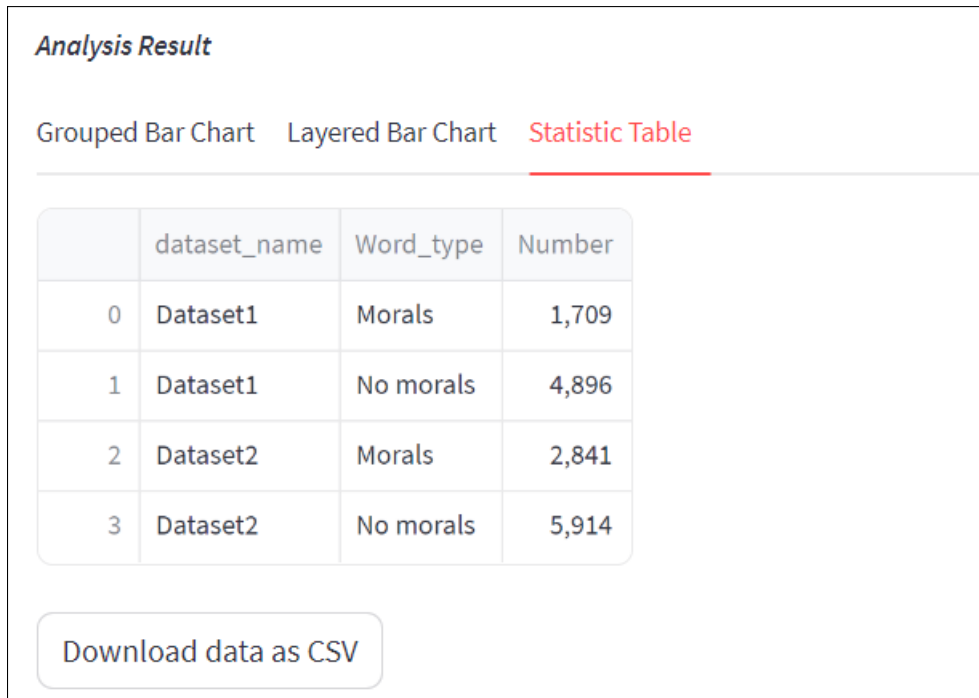
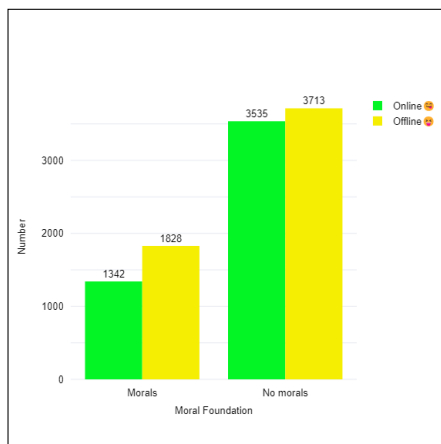
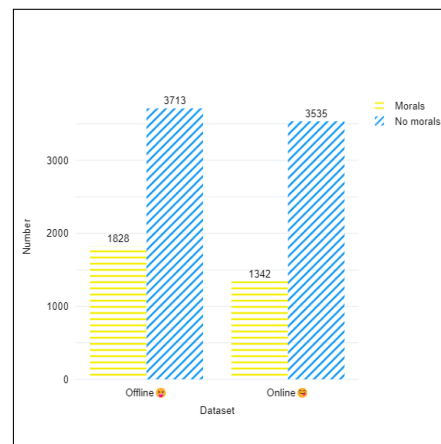


Figure 23: *Moral Foundation Distribution*: Demonstration of Statistical Tables (ADU-Based Comparative Corpora Analysis)



(a) *Moral Foundation Distribution* Module: Example of Group Bar Charts for *ADU-Based Comparative Corpora Analysis*



(b) *Moral Foundation Distribution* Module: Example of Layered Bar Charts for *ADU-Based Comparative Corpora Analysis*

Figure 24: *Moral Foundation Distribution* Module: Example of Various Graphical Visualisations (ADU-Based Comparative Corpora Analysis)

6.2.3 Comparative Corpora Analysis in Arguments

Regarding *Comparative Corpora Analysis* in arguments, *Moral Foundation Distribution* module allows users to fine-tune their search by choosing the type of argumentative relation (either support or attack) and the source of the argument (whether it's from the same or different speakers). Users can also shift between various moral scales for a more nuanced analysis. This

includes four moral scales: moral vs. no moral, positive and negative moral valences, five moral foundations (care, fairness, loyalty, authority, and sanctity), and ten moral categories (positive and negative aspects of care, fairness, loyalty, authority, and sanctity). Moreover, users have the option to display data on the y-axis as either a percentage or an absolute number value. The navigation menu for *Single Corpus Analysis* in ADUs, shown in Figure 25, demonstrates these features.

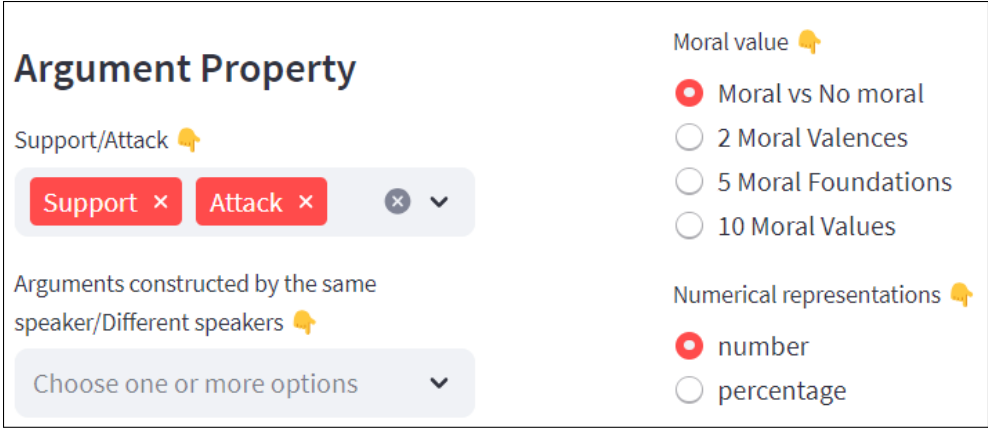


Figure 25: *Moral Foundation Distribution: Overall Navigation Menu (Relation-Based Comparative Corpora Analysis)*

6.3 Interlocutors Distribution

The *Interlocutors Distribution* module is crafted to visualise how different speakers use moral valence strategies in their texts. This module is exclusively linked to the *Entity-Based Analysis* feature and is accessible in both *Single Corpus Analysis* and *Comparative Corpora Analysis*.

6.3.1 Single Corpus Analysis in Entities

Within the *Single Corpus Analysis* framework, the *Interlocutors Distribution* module offers a variety of bar chart formats, specifically stacked, grouped, and layered bar charts. Users are provided with the option to alter the y-axis scale of these bar charts, choosing between percentage and absolute values for visualisation. The navigation menu for the *Interlocutors Distribution* is depicted in Figure 26, and there are separate figures exemplifying each type of bar charts: the stacked bar chart (see Figure 27), the grouped bar chart (see Figure 28), and the layered bar chart (see Figure 29).

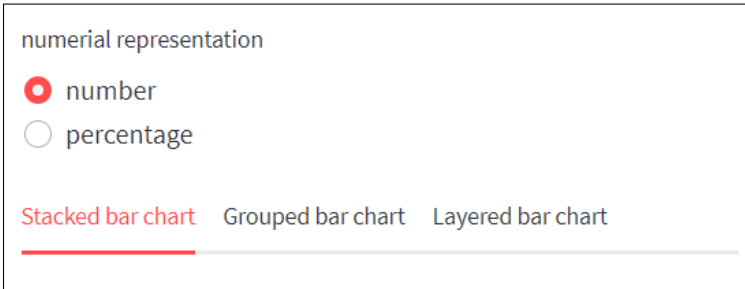


Figure 26: *Interlocutors Distribution: Overall Navigation Menu (Entity-Based Single Corpus Analysis)*

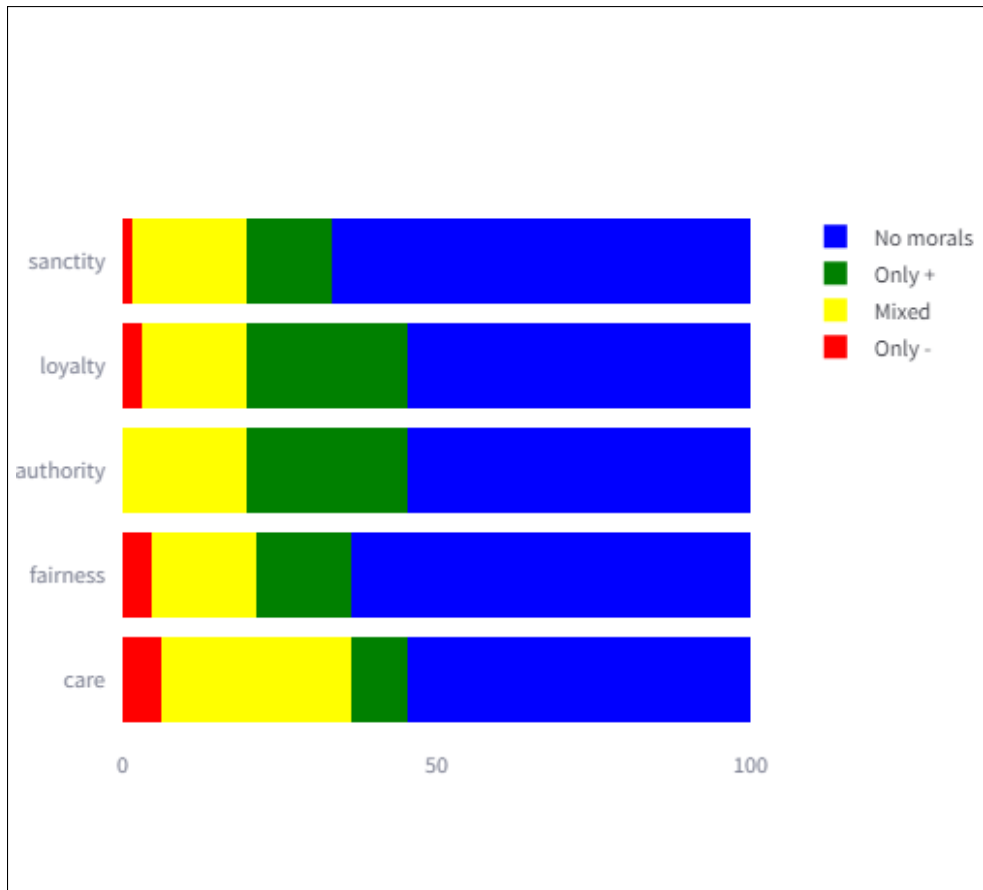


Figure 27: *Interlocutors Distribution: Example of Stacked Bar Charts (Entity-Based Single Corpus Analysis)*

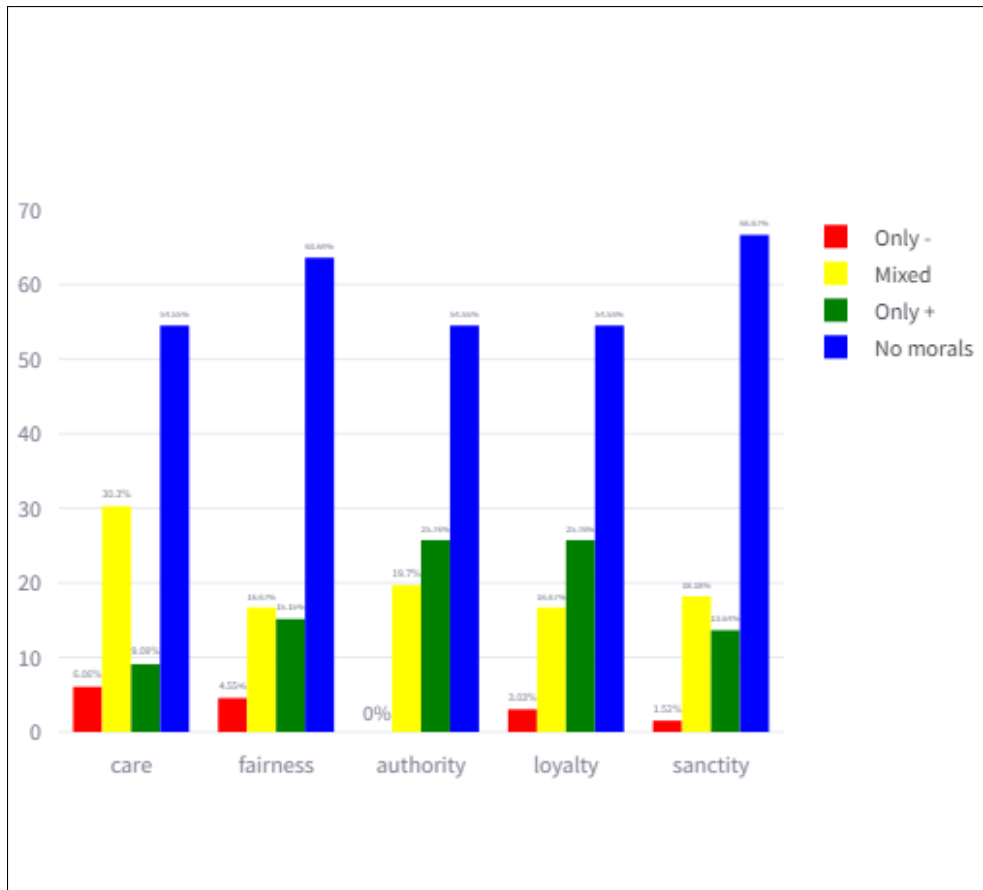


Figure 28: *Interlocutors Distribution: Example of Group Bar Charts (Entity-Based Single Corpus Analysis)*

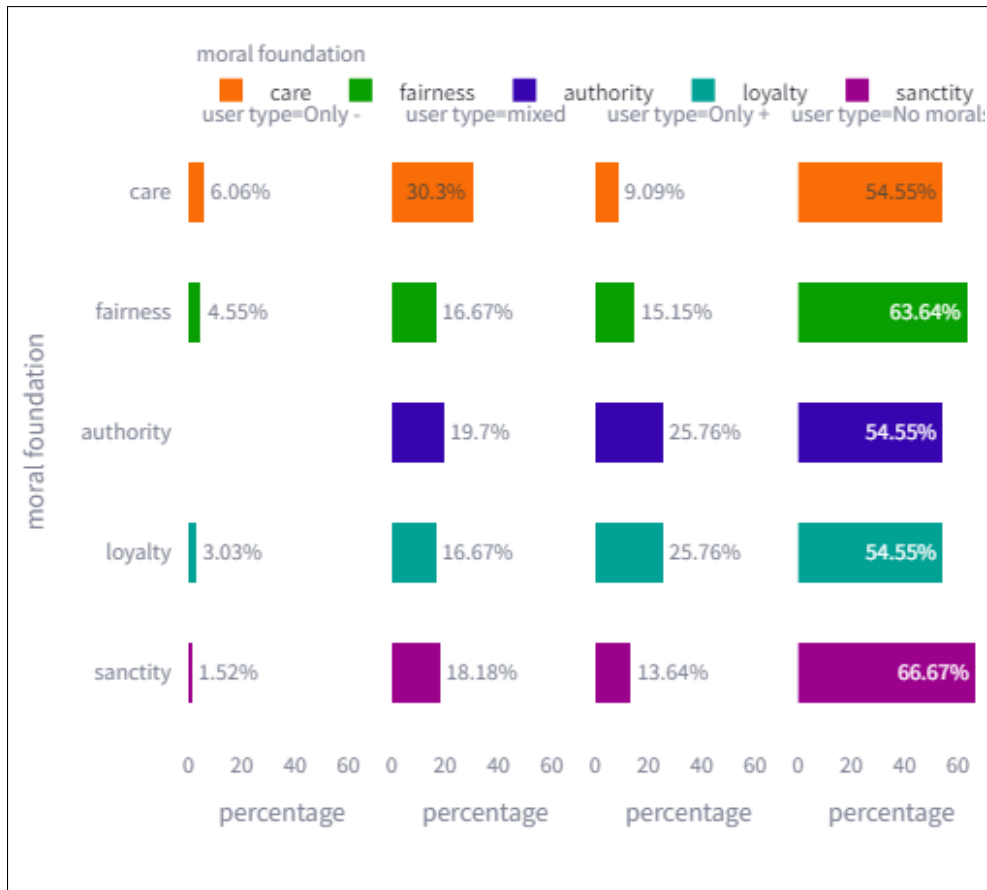


Figure 29: *Interlocutors Distribution*: Example of Layered Bar Charts (*Entity-Based Single Corpus Analysis*)

6.3.2 Comparative Corpora Analysis in Entities

Regarding *Comparative Corpora Analysis*, *Interlocutors Distribution* functionality requires the selection of moral foundations and different y-axis scales for bar chart visualisations (percentage or absolute number).

For visualising all moral foundations, Figure 30 displays the navigation menu of *Interlocutors Distribution*. The resulting heatmap (e.g., Figure 31) illustrates the distribution of speakers across various moral valences for all moral foundations.

For visualising a single moral foundation, Figure 32 displays the navigation menu of *Interlocutors Distribution*. After configuring the settings, the *Interlocutors Distribution* feature offers three distinct types of data representation: the stacked bar chart, the group bar chart, and the layered bar chart. Users can easily switch between these presentation formats using tab selection. In the stacked bar chart (refer to Figure 33), group bar chart (refer to Figure 34) and layered bar chart (refer to Figure 35), customisation options are available. Users can tailor the bar chart to their preferences by selecting different y-axis scales (linear or logarithmic), customising colors for various variables, adjusting the figure size, modifying the font size within the figure, and personalising the figure title. Illustrative examples of stacked, group and layered bar charts are shown in Figure 36, Figure 37, Figure 38.

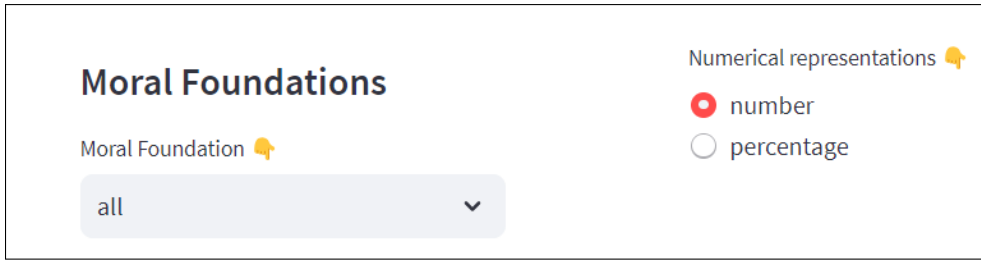
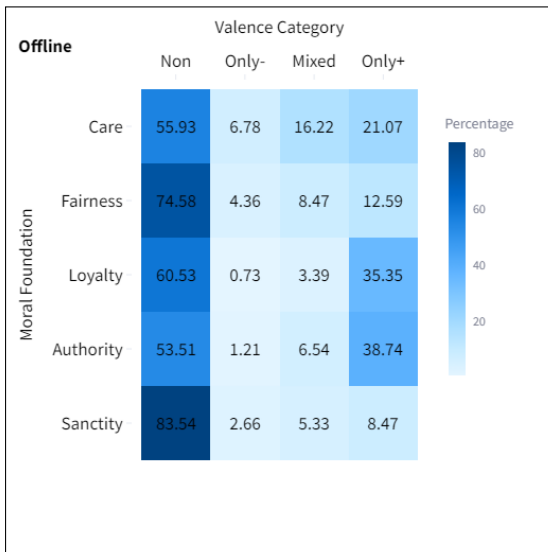
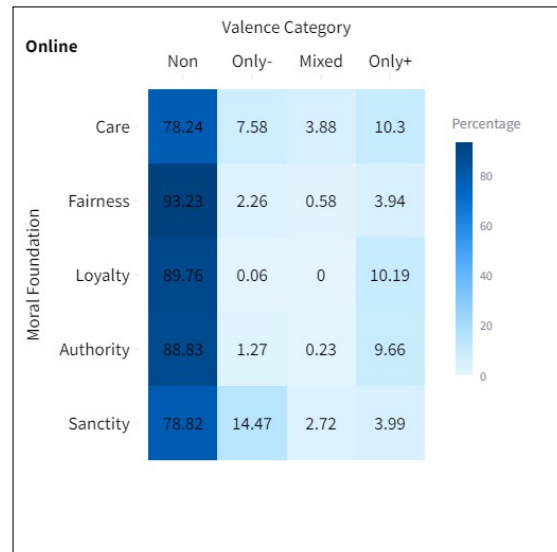


Figure 30: *Interlocutors Distribution: Overall Navigation Menu Part 1 (Entity-Based Comparative Corpora Analysis)*



(a) Interlocutors Distribution for Offline Interlocutors



(b) Interlocutors Distribution for Online Interlocutors

Figure 31: *Interlocutors Distribution: Comparative Analysis of Moral Valence Category Distribution Between Online and Offline Interlocutors*

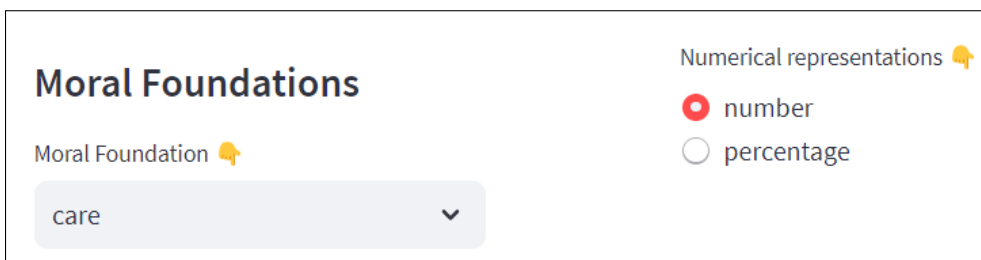


Figure 32: *Interlocutors Distribution: Overall Navigation Menu Part 2 (Entity-Based Comparative Corpora Analysis)*

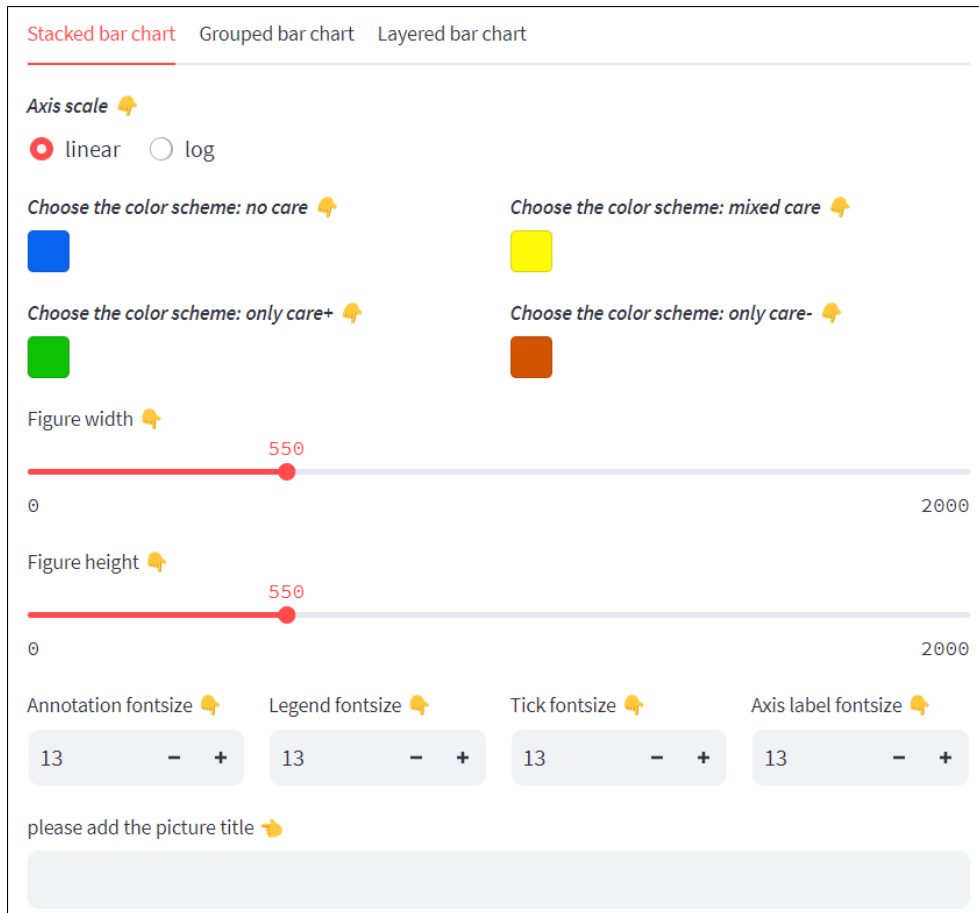


Figure 33: *Interlocutors Distribution: Customisation Menu for Stacked Bar Charts (Entity-Based Comparative Corpora Analysis)*

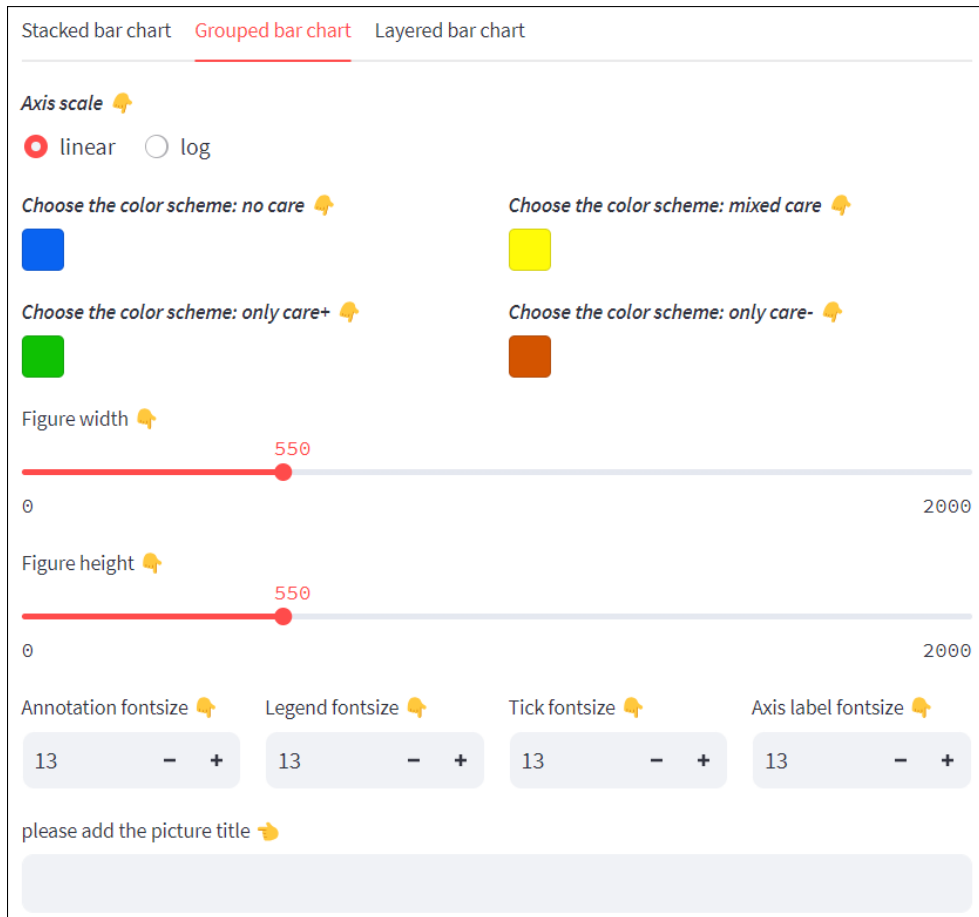


Figure 34: *Interlocutors Distribution*: Customisation Menu for Group Bar Charts (*Entity-Based Comparative Corpora Analysis*)

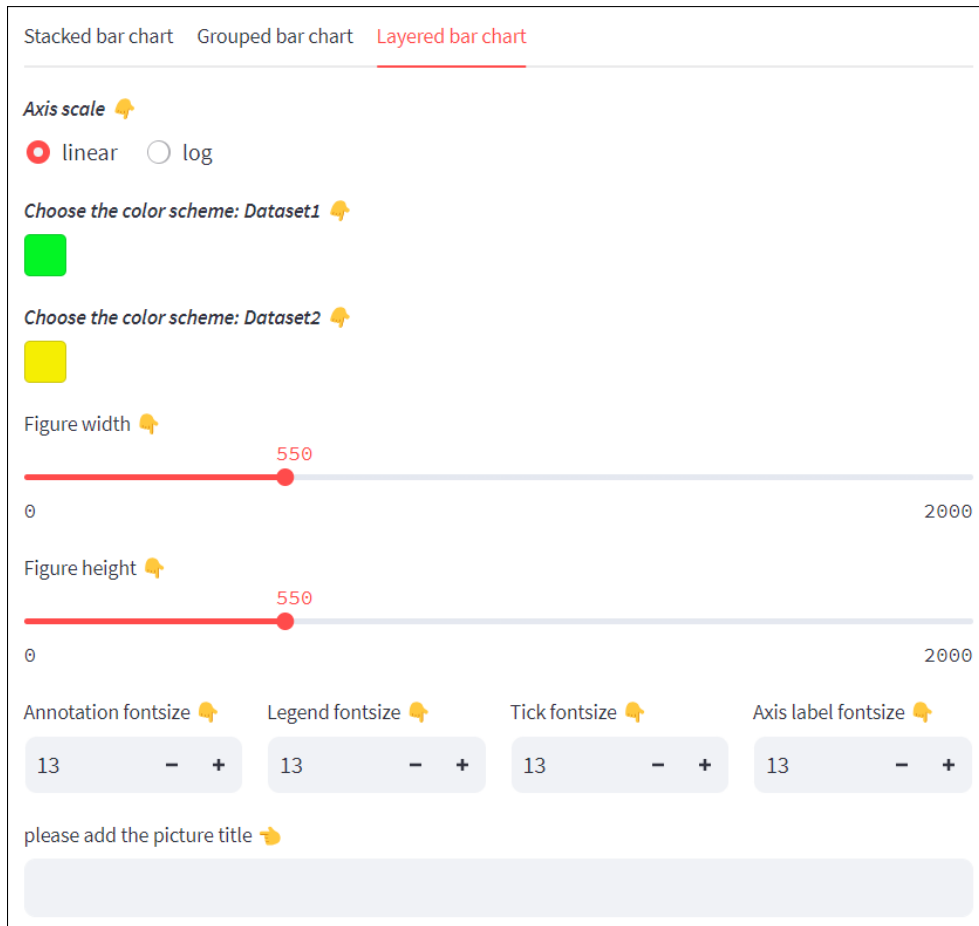


Figure 35: *Interlocutors Distribution: Customisation Menu for Layered Bar Charts (Entity-Based Comparative Corpora Analysis)*

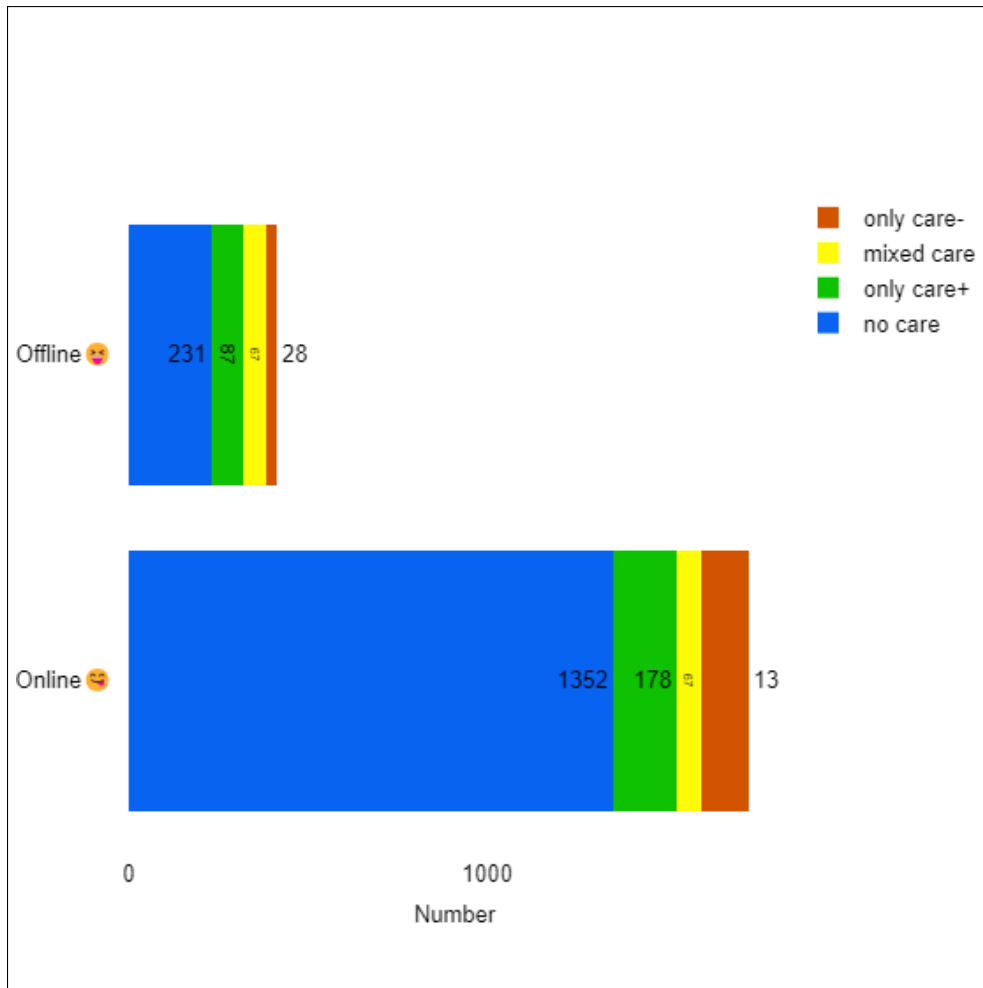


Figure 36: *Interlocutors Distribution: Example of Stacked Bar Charts (Entity-Based Comparative Corpora Analysis)*

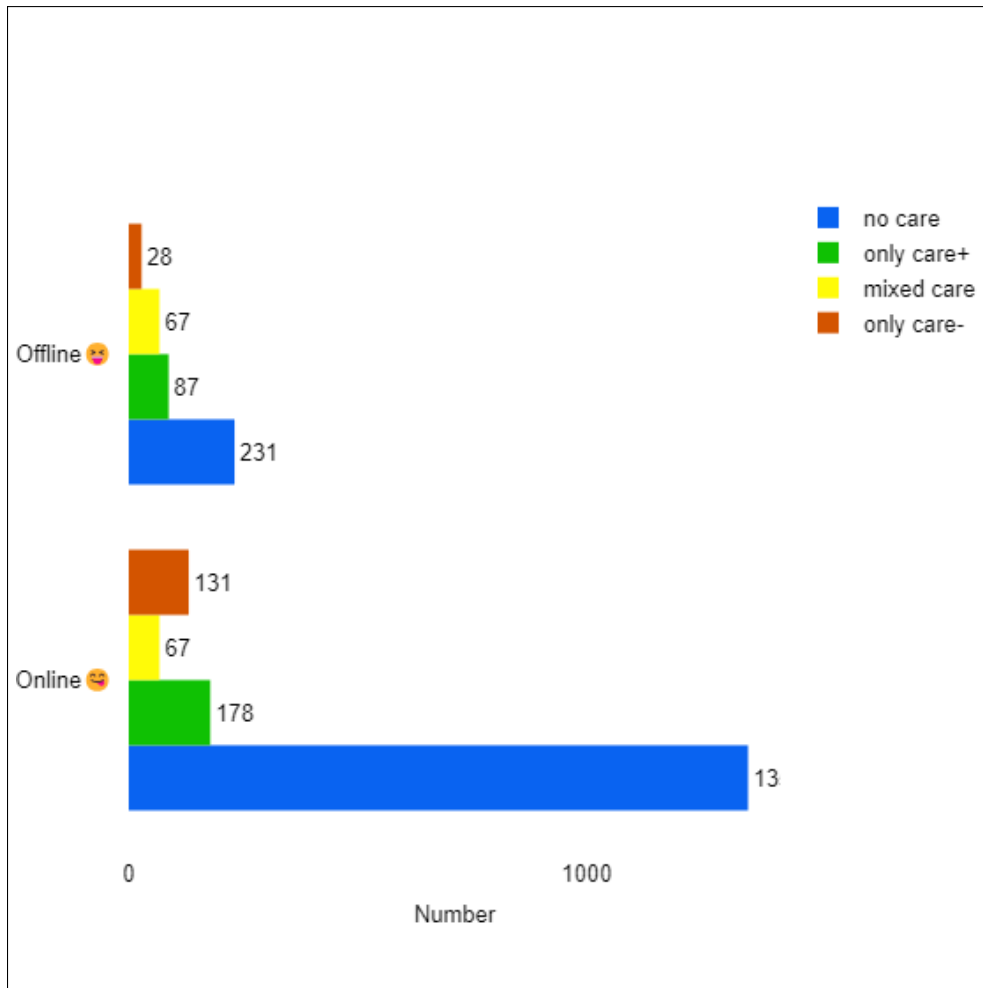


Figure 37: *Interlocutors Distribution: Example of Group Bar Charts (Entity-Based Comparative Corpora Analysis)*

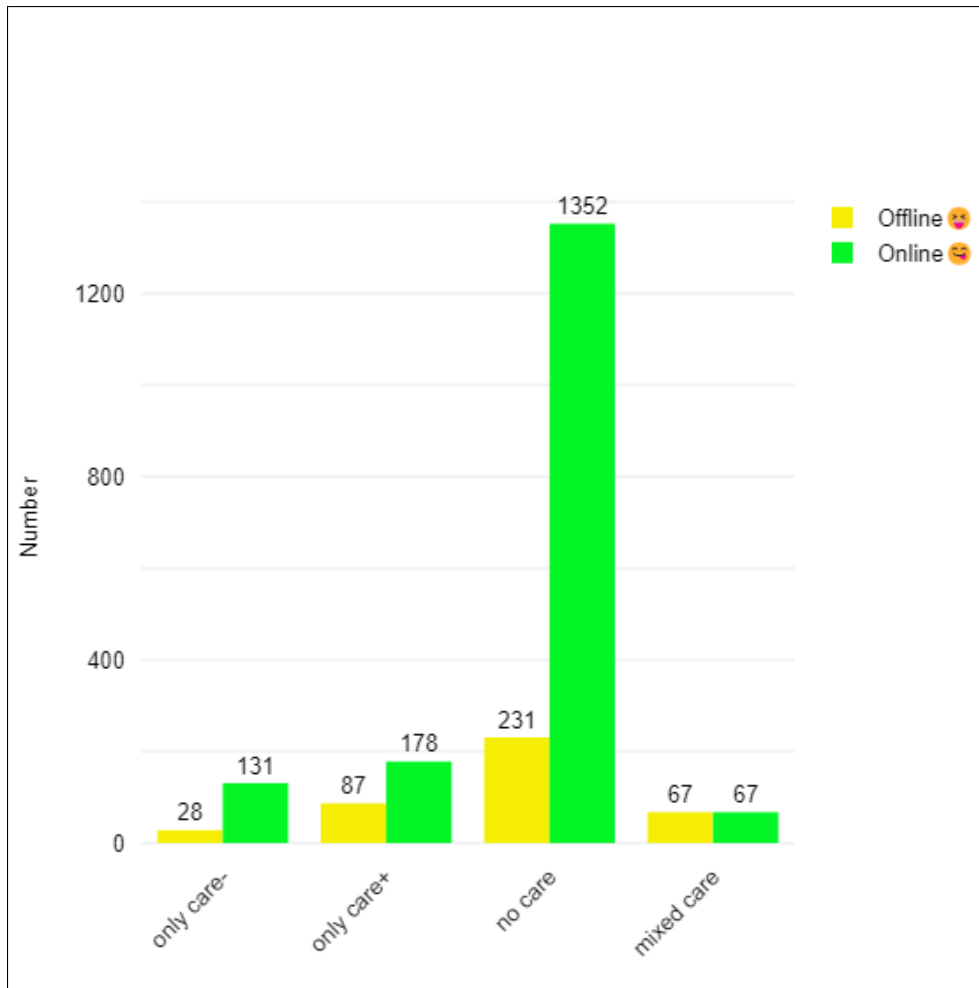


Figure 38: *Interlocutors Distribution*: Example of Layered Bar Charts (*Entity-Based Comparative Corpora Analysis*)

6.4 Interlocutors Moral Scores

The *Interlocutors Moral Scores* module is exclusively linked with *Entity-Based Analysis*. Within *Single Corpus Analysis*, this module reveals each speaker’s moral scores, represented as the percentage of moral foundation within ADUs, for each moral foundation category. In the context of *Comparative Corpora Analysis*, the module compares the average moral scores of speakers across various corpora.

6.4.1 Single Corpus Analysis in Entities

Interlocutors Moral Scores module explores each speaker’s discourse in terms of moral foundation expression densities (i.e., calculating moral foundation scores for each speaker). It computes the percentage of text encompassing particular moral categories (i.e., care+, care-, fairness+, fairness-, loyalty+, loyalty-, authority+, authority-, sanctity+, and sanctity-) for each speaker in the selected corpora and represents the results in a heatmap format (e.g., Figure 39).

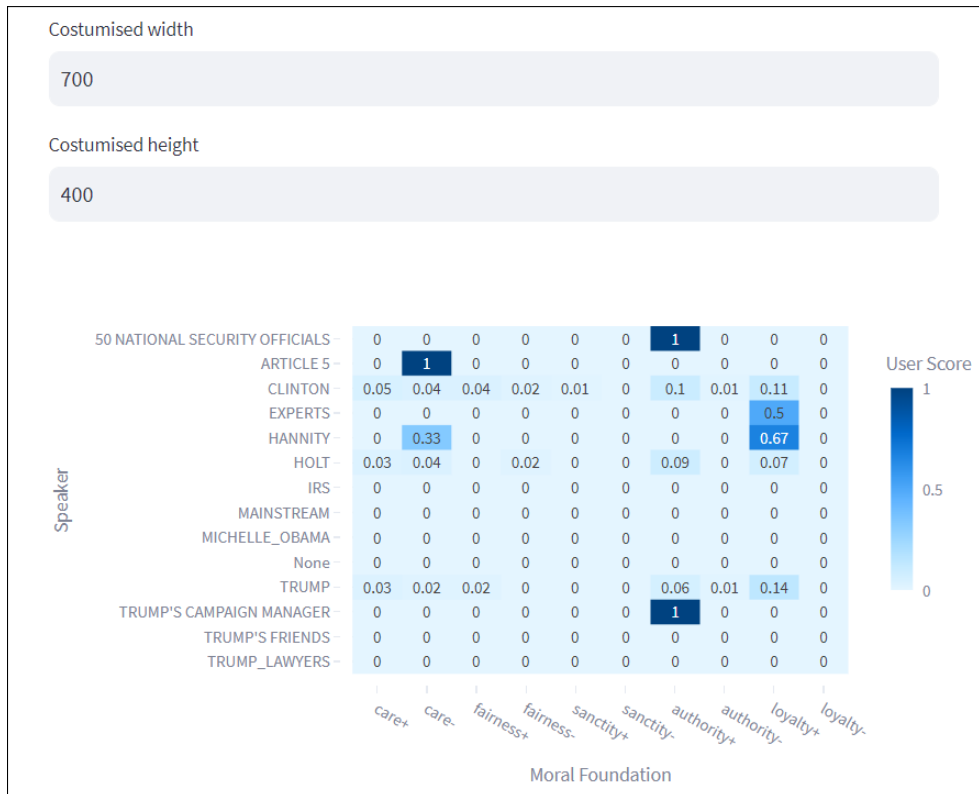


Figure 39: *Interlocutors Moral Scores: Individual Moral Foundation Scores (Entity-Based Comparative Corpora Analysis)*

6.4.2 Comparative Corpora Analysis in Entities

A spider (radar) chart is available for users (similar to Figure 40). The chart visualises the average user moral scores across each corpora. Each axis of the spider chart represents a different moral foundation, and the radial distance from the centre signifies the average moral score.

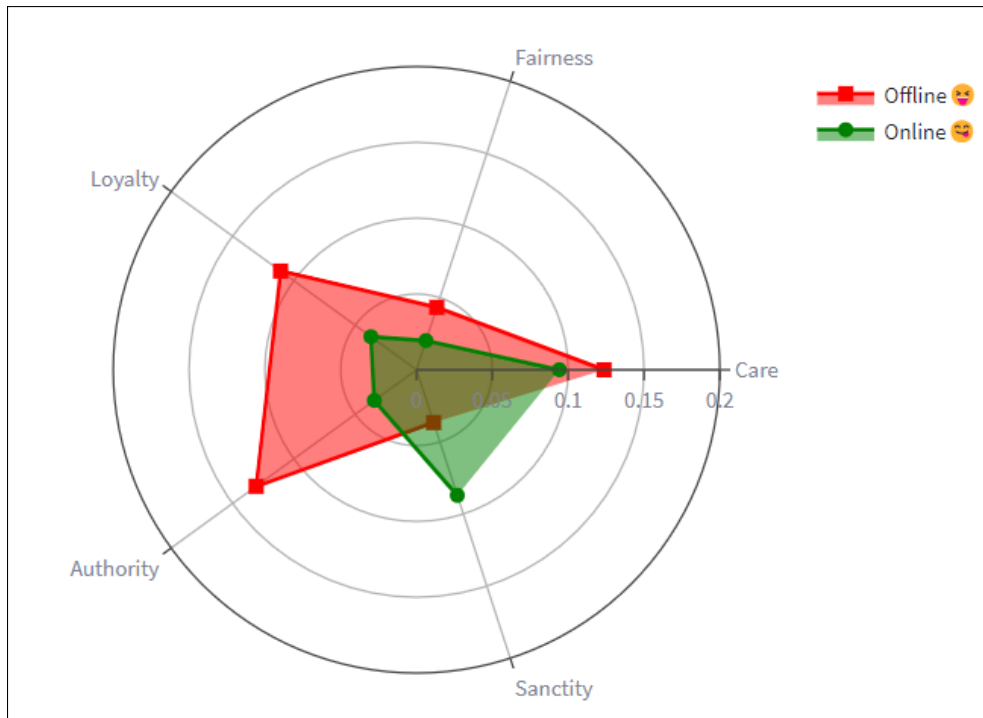


Figure 40: *Interlocutors Moral Scores: Average Moral Scores for Interlocutors between Offline Dialogue and Online Dialogue (Entity-Based Comparative Corpora Analysis)*

6.5 Interlocutors' Argumentation Network

Interlocutors' Argumentation Network is specifically designed for *Entity-Based Analysis*. This feature is exclusively available within the context of *Single Corpus Analysis*. It visualises the conversational argumentation between different speakers during the debate considering their moral valence strategies. The resulting network structure can reveal the formation of distinct groups, rooted in moral foundations, as a consequence of the ongoing argument exchange. To visualise the results, users must select a particular moral scale and argumentation relation (e.g., Figure 41) to construct the argumentation network.

More specifically, the scale comprises three primary dimensions: *Moral vs No Morals*, *Moral Valences* (which encompasses positive moral orientation, negative moral orientation, and the absence of morals), and *Moral Foundations* (including care, fairness, loyalty, authority, sanctity, and the absence of any moral foundations). Additionally, for argumentative relations, users can choose between two fundamental options: *support* or *attack*. Figure 42 shows an example of a constructed argumentation network.

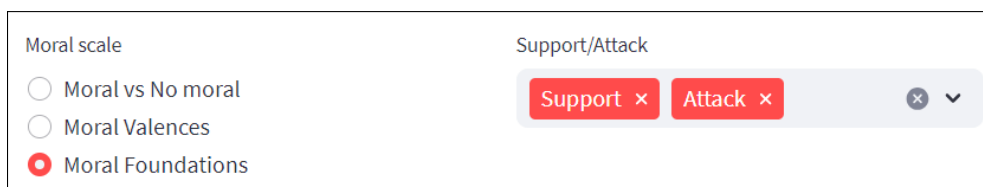


Figure 41: *Interlocutors' Argumentation Network: General Navigation Menu*

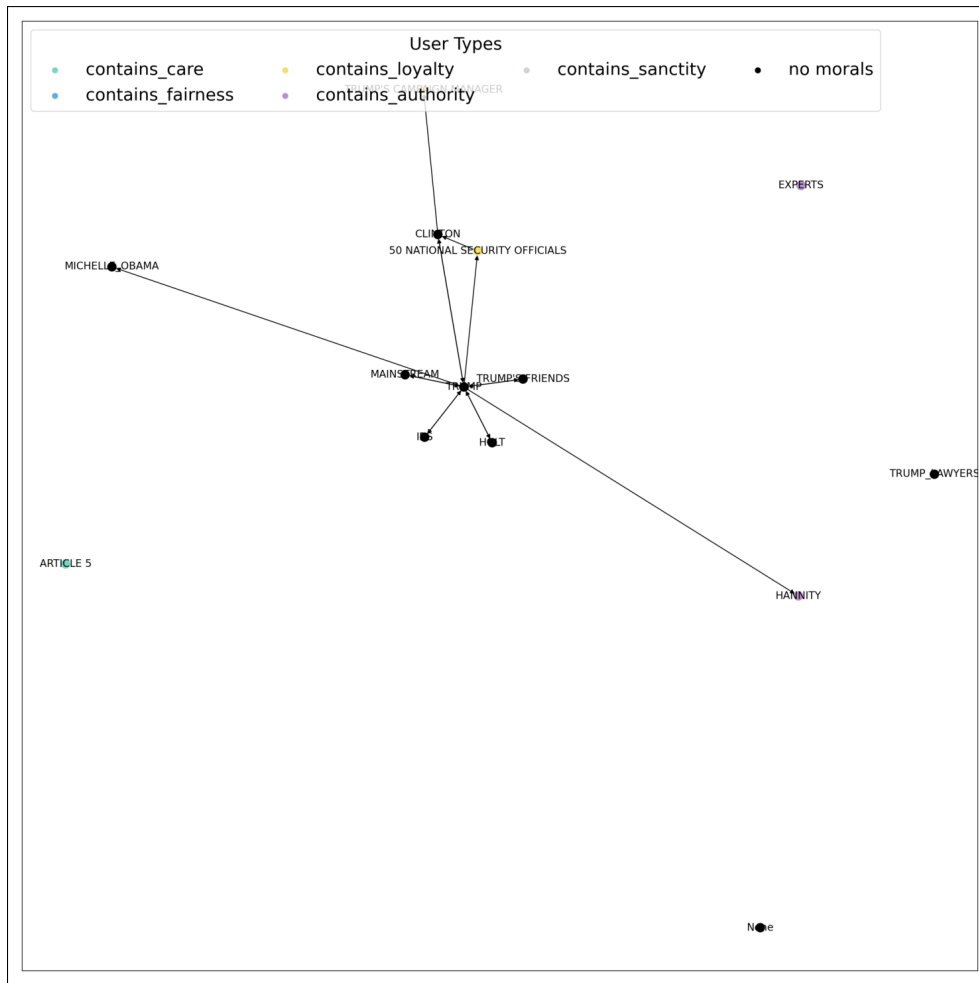


Figure 42: *Interlocutors' Argumentation Network: Argumentation Network Example*

6.6 Interlocutors Interaction

Interlocutors Interaction module is specifically tailored for *Entity-Based Analysis*. It can only be accessed under *Single Corpus Analysis*. *Interlocutors Interaction* manifests the argumentative interaction pattern by analysing the interlocutor argumentation network presented, focusing specifically on argument exchange frequency visualised as the heatmap (e.g., Figure 44).

To visualise the results, users must select a particular moral foundation (care, fairness, loyalty, authority and sanctity) and the argument source (constructed by the same speaker or different speakers). The navigation menu is shown in Figure 43

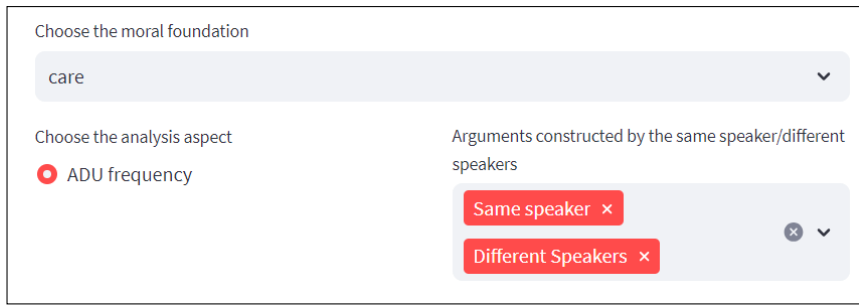


Figure 43: *Interlocutors Interaction*: Overall Navigation Menu

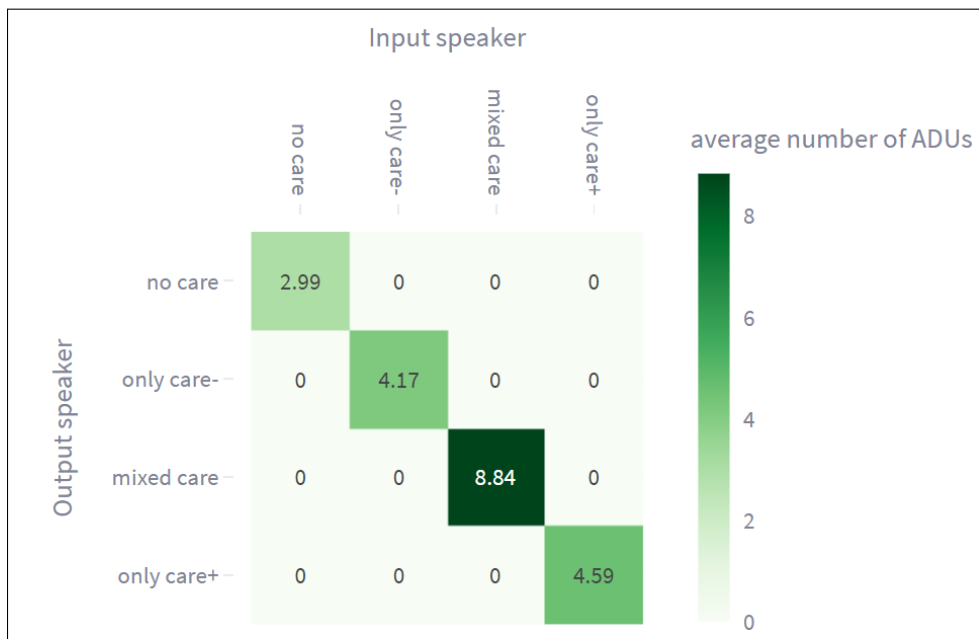


Figure 44: *Interlocutors Interaction*: Example of Speakers' Argumentative Interaction

7 Conclusion

Throughout this user manual, we have endeavoured to provide a comprehensive guide to utilising the features and functions of the MArgAn. As users familiarize themselves with the Interface and its functionalities, we encourage users to regularly revisit this manual for clarification and guidance. Additionally, with the evolving nature of technology and research, it's essential to stay updated on the latest features and best practices associated with the system.

In closing, we hope that this manual has served as a valuable resource in your journey to decode and understand the intricate web of moral foundations in argumentation. Good Luck!

References

- Budzynska, K., M. Janier, J. Kang, B. Konat, C. Reed, P. Saint Dizier, M. Stede, and O. Yaskorska (2015). Automatically identifying transitions between locutions in dialogue. In *1st European Conference on Argumentation (ECA 2015)*.
- Budzynska, K. and C. Reed (2011). Speech acts of argumentation: Inference anchors and peripheral cues in dialogue. In *Workshops at the Twenty-Fifth AAAI Conference on Artificial Intelligence*.
- Duthie, R., K. Budzynska, and C. Reed (2016). Mining ethos in political debate. In *Computational Models of Argument: Proceedings from the Sixth International Conference on Computational Models of Argument (COMMA)*, pp. 299–310. IOS Press.
- Visser, J., B. Konat, R. Duthie, M. Koszowy, K. Budzynska, and C. Reed (2020). Argumentation in the 2016 us presidential elections: annotated corpora of television debates and social media reaction. *Language Resources and Evaluation* 54(1), 123–154.