



**BORDERS IN
GLOBALIZATION**

BIG DYADS CODE BOOK

Version 2 (2024)



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About Us

Borders in Globalization Lab (BIG Lab) is hosted by the Centre for Global Studies at the University of Victoria in Victoria British Columbia Canada.

Territorial Acknowledgement

We respectfully acknowledge the ləkʷəŋən peoples on whose unceded territory the University of Victoria is located and the Songhees, Esquimalt and W̱SÁNEĆ nations whose relationships with these lands and waters shape their political thought, governance and self-determining authority that transcend the imposition of state borders and should inform how we all relate to this territory.

Borders in Globalization Dyads

Database Codebook

The increased prominence of disputes about how to manage, police, and secure borders reveals that the territoriality of borders is under tremendous pressure. Despite the incredible need for high quality research on borders, border research is limited by the lack of quantitative data, and the database project described here is aimed at countering these limitations. By providing quantitative data on a variety of theoretically and empirically important aspects of dyads and their borders, our work will bolster current and future qualitative work. More than that, our database will allow for large scale comparative work. Finally, given that we are collecting data on all dyads of the world, our database will provide a complete census set of data, allowing us to make claims without statistical error. Our ultimate goal is to develop up to 50 indicators per specific area of knowledge in border studies: (1) border culture, (2) sustainability across borderlands, (3) border security, (4) border history, (5) governance of borders, and (6) border flows/mobility.

Through BIG Dyads Database we aim to:

- make our research available to fellow researchers and to the public
- help store data already gathered and, where possible, quantify qualitative data
- exploit data to shed light on trends and insights hitherto hidden from observation
- formulate new research questions on the basis of current and prospective indicators
- publish findings which have been made possible through the database

We expect the BIG Dyads database to be a major contribution to border scholarship, and to bolster and facilitate further research in the various fields of comparative border studies. This relational database brings the six themes of the Borders in Globalization project together and allows our researchers to not only structure and exploit the current data that we have collected, but also open up new research avenues and, in turn, help grow the database itself.

This database project is headed up by the team at the University of Victoria and the research assistants housed there; however, all network partners are integral to this work, both in developing new indicators and undertaking data collection. For more information, please visit our website biglobalization.org/dyads-database/ or email our database manager at bigdatabase@uvic.ca.

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*Represents data tables where data collection is ongoing.

1. About the Database.

The Borders in Globalization (BIG) Dyads Database is a relational database (RDB). In simple terms, an RDB organizes several data tables in relation to one another and allows for easy and fast accessing, querying, and updating of data stored. More specifically, not only are records (rows) in a database crossed by attributes (columns), but multiple tables can also be related to one another. The BIG Dyads is an RDB that takes the ‘dyad’— the pairing of nation states divided by a boundary of some kind —as its main building block, each dyad forming a unique record that is crossed by indicators drawn from the six BIG themes: (1) border culture, (2) sustainability across borderlands, (3) border security, (4) border history, (5) governance of borders, and (6) border flows/mobility.

Under the supervision of the database manager, BIG-affiliated researchers design and develop their own data tables under the theme that overlaps with their professional interests. General guidelines and templates are available for each data table, and the results are standardised and approved by the database manager before they become integrated into the separate theme-based tables that come together and form BIG Dyads. Each data table is comprised of indicators that provide attributes of a dyad. Each data table indicator may directly correspond to a database variable, or, in most cases, the indicator may be broken down into multiple variables: this is done mainly to separate textual/qualitative data from numeric/quantitative data and thus allow easy manipulation of both in querying. For economy of operations, textual data is in certain cases further translated into Boolean or other finite-set variables, or a combination of both.

1.1. Key Attributes.

As with any relational database, the BIG Dyads Database is organized according to primary and foreign keys. The dyad ID is used as the primary key representing each unique dyad pair and serves as the foreign key in other data tables, linking them to one another.

- Dyad ID:
 - The dyad ID is an ordinal number starting at 1001 and assigned to each dyad record which had already been ranked according to UNG_region. Dyads not found in the BIG data table but incorporated here were simply added to the list, and the dyad ID is a simple count for these dyads. This is used as the primary key of the main table and foreign key to the other individual dataset tables.
- Country_1, country_2:
 - The two countries the boundaries of which form a distinct dyad. Each dyad is unique (see DyadID above), and the only repetitions of country pairs occurs when one dyad is terrestrial and the other maritime (which are assigned two distinct, consecutive Dyad_IDs). The order in which a dyad is defined— Country 1-Country 2 vs Country 2-Country 1— is not meaningful but rather alphabetical.

All country names are input into the database in their English forms. For countries that are overseas territories or constituents of another state (such as Reunion or Mayotte), the country name comes first, followed by a double dash and the three letter abbreviation of that other state (for example, Reunion--FRA or Aruba--NDL). The abbreviations are taken from the IMF's official country abbreviations. In those cases where two countries have a secondary boundary, such as the Øresund bridge between Sweden and Denmark, that is clarified following the country name (e.g., Sweden—Øresund Bridge).

1.2. Missing and Inapplicable Data, Cut-Off Dates.

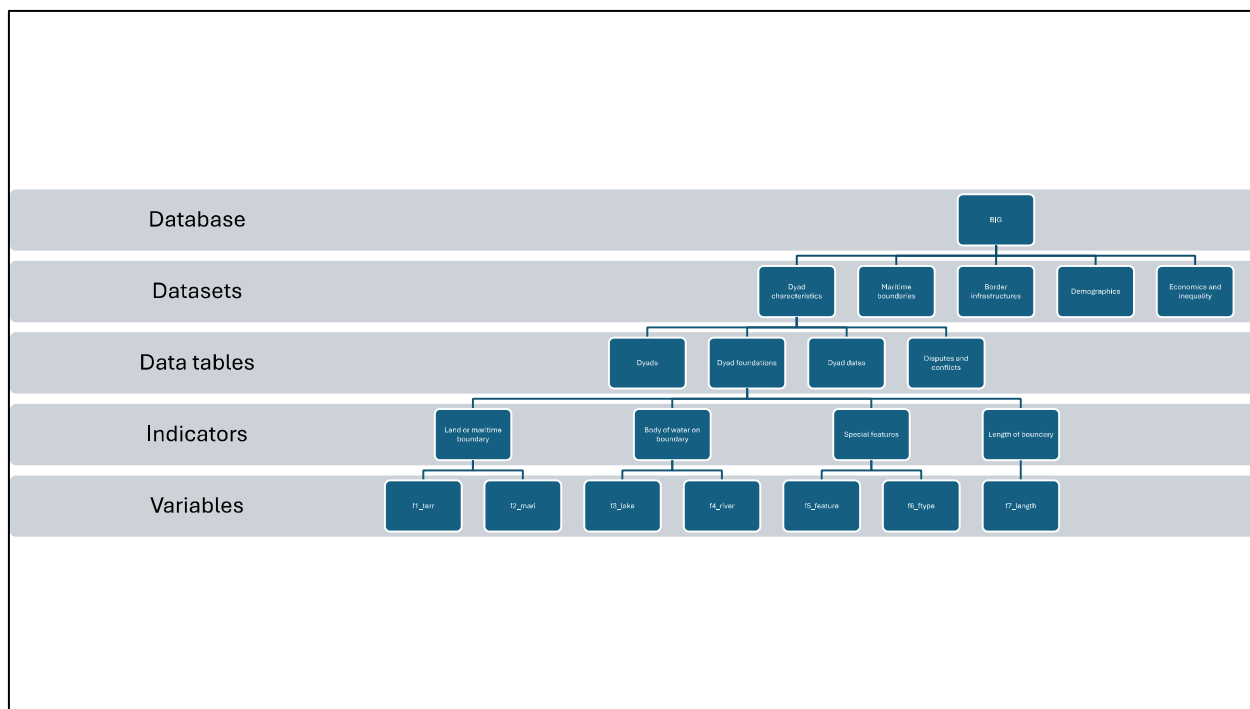
Following code book best practice, coding missing and inapplicable data instead of leaving them empty or inaccurately supplying a zero ensures that any omission on the part of data collector or database manager results in a blank, i.e. uncoded, cell. In our Code Book, -888 stands for 'missing data' and -999 for 'inapplicable data': missing data means the data was unavailable for some (known or unknown) reason but not structurally missing; inapplicable data is data that is impossible to fill, e.g. the number of maritime dyads for a landlocked country, which can be put down as 0 but -999 is more accurate.

We have also used -1982 as a cut-off point for all maritime dyads that lack dates of establishment (the minus sign is used to differentiate this cut-off point from the year 1982 when the latter is used as a date and not a cut-off point). 1982 was chosen, because in that year the Law of the Sea establishing EEZ's came into effect. If two states have not already an agreement establishing a maritime boundary, we have made the decision to use that cut-off point as the establishment of a de facto maritime border. Therefore, the -1982 instances are where the states have yet signed an official agreement, whereas the 1982 dates (or any other dates for that matter) are for dyads that have a treaty in the (specified) year.

1.3. Structure of the Database.

The database is structured hierarchically, where the database contains many datasets, each dataset includes a set of thematically linked data tables organized by primary keys, and these data tables, in turn, include some number of conceptual indicators. Finally, each indicator is made up of a series of simple variables. The diagram below illustrates this structure, using the example of the [Dyad Foundations](#) data table.

As the figure below shows, the Dyad Foundations data table is one of several that make up the Dyad Characteristics Dataset. Within that table, there are four indicators: land or maritime boundary; body of water on boundary; special features; and length of boundary. Each of these conceptual indicators is then constituted by a set of variables, as shown in the last box of the figure.



2. BIG Dyads Datasets.

The Borders in Globalization Dyads Database includes datasets on a wide range of themes, including the essential dyad characteristics, the infrastructure and connectivity of dyads, dyad-level economics and inequality, and more. These datasets are all organized into discrete data tables but are all connected to each other through a shared framework (the ‘dyad_id’). Detailed below are the data tables of the BIG Dyads Database, grouped thematically into the datasets of the database.

2.1. Dyad Characteristics.

This dataset provides the essential characteristics of the dyads and can be used as the basis of a variety of comparative analyses. Included in the dataset are data tables on the dyad foundations, dates of establishment, and conflicts.

2.1.1. Dyads.

Concept: This data table sets down the list of country dyads and matches them with their dyad ids. These dyad ids are the organizing principle of the database.

Organizing principle:

- Primary key: **dyad_id** provides the id number specific to the data table and organizes it according to unique row.
 - Values: 1001 and above.

Number of indicators | variables: 2 | 9

- Indicator 1: Dyads.
 - Variable 1: **country1** provides the name of the first country in the dyad.
 - Type: String
 - Values: Unlimited
 - Variable 2: **country2** provides the name of the second country in the dyad.
 - Type: String
 - Values: Unlimited
- Indicator 2: Dyad characteristics.
 - Variable 1: **ung_region** provides the UNG M49 codes for country 1 and country 2 as a four digit number.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888, -999.
 - Variable 2: **osce_1** measures whether country 1 of the dyad pair is an OSCE country (1) or not (0).
 - Type: Boolean.
 - Values: 0,1; -888, -999.
 - Variable 3: **osce_2** measures whether country 2 of the dyad pair is an OSCE country (1) or not (0).
 - Type: Boolean.
 - Values: 0,1; -888, -999.
 - Variable 4: **osce_dyad** measures whether both countries of the dyad are OSCE countries (1) or not (0).
 - Type: Boolean.
 - Values: 0,1; -888, -999.
 - Variable 5: **interregional_dyad** measures whether the dyad crosses the boundaries of a UNG region (1) or not (0).
 - Type: Boolean.
 - Values: 0,1; -888, -999.
 - Variable 6: **intercontinental_dyad** measures whether the interregional dyad also crosses a continental boundary (1) or not (0).
 - Type: Boolean.
 - Values: 0,1; -888, -999.
 - Variable 7: **un_recognition** measures whether the dyad boundary is recognized by the UN (1) or not (0).
 - Type: Boolean.
 - Values: 0,1; -888, -999.

Design and updates:

- Design: This data table provides the dyads and their id numbers, which are then used as the organizing basis for the database as a whole. The order of the countries is not significant, and neither is the value of the id number.
- Updating schedule: this data table needs to be updated only on an ad hoc basis, when and as dyads are added to the database.

Key definitions:

- The **ung_region** variable categorization is based on Geographic Regions of the United Nations publication "Standard Country or Area Codes for Statistical Use," originally published as Series M, No. 49 and now commonly referred to as the M49 standard. The M49 standard categorizations are as follows:
 - Africa: 1
 - Northern Africa: 11
 - Eastern Africa: 12
 - Middle Africa: 13
 - Southern Africa: 14
 - Western Africa: 15
 - Americas: 2
 - Caribbean: 21
 - Central America: 22
 - South America: 23
 - Northern America: 24
 - Antarctica: 29
 - Asia: 3
 - Central Asia: 31
 - Eastern Asia: 32
 - South-Eastern Asia: 33
 - Southern Asia: 34
 - Western Asia: 35
 - Europe: 3
 - Eastern Europe: 36
 - Northern Europe: 37
 - Southern Europe: 38
 - Western Europe: 39
 - Oceania: 4
 - Australia and New Zealand: 41
 - Melanesia: 42
 - Micronesia: 43
 - Polynesia: 44
- Some of the dyads in the data table cross the boundaries of a UNG region. When this is the case, the first two and second two digits of the **ung_region** variable will be non-repeating.
- Similarly, some of the interregional dyads are also intercontinental. Where this is the case, the first and third digits of the **ung_region** variable will be different.

Uses and limits:

- Uses: This data table is used to organize the other data tables by country pairs, forming the organizational basis of this relational database.
- Limits: this data table contains little information about the dyads or dyad countries, simply providing a numerical id number. Rather than providing substantive information on the dyads, it provides the organizing framework for the database.

2.1.2. Dyad Foundations.

Concept: This data table provides the foundational characteristics of the dyads, namely their geography.

Organizing principle:

- Primary key: **f_id** provides the id number specific to the data.
 - Values: f_1 and above.
- Foreign key: **dyad_id** identifies the relevant country dyad.

Number of indicators | variables: 5 | 7

- Indicator 1: Dyad.
 - Variable 1: **dyad_id** identifies the country-country dyad in question.
 - Type: Numeric.
 - Values: 1001 and above.
- Indicator 2: Land or maritime border.
 - Variable 1: **f1_terr** determines whether the dyad is terrestrial (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
 - Variable 2: **f2_mari** determines whether the dyad is maritime (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
- Indicator 3: Body of water on the border.
 - Variable 1: **f3_lake** determines whether any portion of the dyad border is crossed by/made up of a lake (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
 - Variable 2: **f4_river** determines whether any portion of the dyad border is crossed by/made up of a river (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
- Indicator 4: Special features.
 - Variable 1: **f5_feature** determines whether a given dyad contains a special feature, i.e. an enclave/exclave, zone of shared sovereignty, or some other exceptional feature, (1) or not (0)
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
 - Variable 2: **f6_ftype** names the special feature corresponding to 'feature' (string).
 - Type: String.
 - Values: unlimited; -888, -999.
- Indicator 5: Length of boundary.
 - Variable 1: **f7_length** gives the length in km of the given dyad. If the dyad is a maritime dyad with both a territorial sea section and an economic exclusive zone, then the length of the EEZ is given.
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.

Design and updates:

- Design: This data table gives more detail on the nature of each dyad, allowing for the separation of dyads into smaller categories based on these features.
- Updating schedule: this data table needs to be updated only on an ad hoc basis, when changes to dyads are made.

Uses and limits:

- Uses: This data table can be used to separate dyads with different characteristics from one another. It allows for the separate analysis of land dyads and maritime dyads, and dyads with special features. This data table is helpful both in gaining more detailed information about each dyad and in allowing for smaller categorization of dyads for analysis.
- Limits: this data table is limited by its binary nature. The aspects of the dyad are marked only as yes or no, leaving no room for extra information. This means that the data table lacks detail—for example, the data table does not record to what extent a country dyad crosses a river or lake, only that it does so to some degree.

2.1.3. Dyad Dates.

Concept: This data table tracks the dates of delimitation and adjustment of the database's dyad boundaries, as well as their historical antecedents.

Organizing principle:

- Primary key: **h_id** provides the organizing principle of the data table and identifies each unique row.
 - Values: h_1 and above.
- Foreign key: **dyad_id** identifies the country-country dyad in question and links this data table back to the rest of the database.

Number of indicators | variables: 4 | 7

- Indicator 1: Dyad.
 - Variable 1: **dyad_id** identifies the country-country dyad in question.
 - Type: Numeric.
 - Values: 1001 and above.
- Indicator 2: Year of establishment.
 - Variable 1: **h1_year** measures the year in which the essential shape of the current dyad was established.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888, -999.
 - Variable 2: **h2_treaty** provides the name of the treaty that set the essential shape of the current dyad, where applicable.
 - Type: String.
 - Values: Unlimited; -888, -999.
- Indicator 3: Adjustments.
 - Variable 1: **h3_adjust** provides the year of the last minor adjustment.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888, -999.

- Variable 2: **h4_ad_treaty** provides the name of the treaty that determined the minor adjustment, where applicable.
 - Type: String.
 - Values: Unlimited; -888, -999.
- Indicator 4: Historical antecedent.
 - Variable 1: **h5_year** provides the year of the established of the historical antecedent of the current dyad.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888, -999.
 - Variable 2: **h6_hist_treaty** provides the name of the treaty that determined the historical antecedent, where applicable.
 - Type: String.
 - Values: Unlimited; -888, -999.

Design and updates:

- Design: The initial goal of the was to establish the date from which the current border of every dyad can be thought of as stable. Once research began, however, the complexity of the history of borders and the needs of the database made it clear that 3 categories of dates were needed: the establishment of the border, adjustments made to the border, and the historical antecedent of the border. Each of the first 3 categories has two columns, one for numeric and one for textual data.
- Updating schedule: This data table should be updated on an ad-hoc basis, as changes to the dyad boundaries and their governing treaties are made.

Key definitions:

- For the purposes of this data table, a minor adjustment is understood to be one that does not fundamentally change the shape of the dyad from when it was established.
- A dyad boundary is considered to have a historical antecedent in those cases where the modern dyad runs on much the same lines as the dyad between predecessor states.

Uses and limits:

- Uses: this data table can be used to establish the ‘stability’ of borders around the world. The older the date of establishment of a dyad is, the longer it can be said to have been stable. This can be useful to compare the stability of borders with other indicators such as conflict, inequality, transboundary agreements etc.
- Limits: the data table is limited by the fact that it takes a synchronic approach and can only include dyads that still exist today. In cases where extinct dyads match up well with current dyads, extinct dyads can be included under the ‘Historical Antecedents’ indicator, but otherwise are not included in the database. This means that the data table can only describe the world as it is today and is not particularly useful for a diachronic analysis of the establishment of dyads.

2.1.4. Disputes and Conflicts.

Concept: This indicator measures disputes and conflicts over dyad boundaries.

Organizing principle:

- Primary key: **bdc_id** provides the organizing principle of the data table and identifies each unique row.
 - Values: bdc_1 and above.
- Foreign key: **dyad_id** identifies the country-country dyad in question and links this data table back to the rest of the database.

Number of indicators | variables: 5 | 6

- Indicator 1: Dyad.
 - Variable 1: **dyad_id** identifies the country-country dyad in question.
 - Type: Numeric.
 - Values: 1001 and above.
- Indicator 2: Border disputes.
 - Variable 1: **bdc_1** determines whether one or both of the states on the dyad dispute the position of the border (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
 - Variable 2: **bdc_2** measures whether the border between the dyad states has been officially delimited (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
 - Variable 3: **bdc_3** measures whether one or both of the dyad states dispute ownership of some portion of the territory (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
- Indicator 3: Border conflict.
 - Variable 1: **bdc_4** determines whether the current shape of a dyad arose out of a military conflict, violent independence, and so on, (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999
- Indicator 4: Independence.
 - Variable 1: **bdc_5** determines whether the dyad arose out of an independence/partition regardless of the presence of violence (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.

Design and updates:

- Design: These indicators were developed in order to track the origin of dyads today and their status vis-à-vis the states straddling them. The indicators allow for comparisons of conflict across dyads.

- Updating Schedule: The indicators should be updated on an ad hoc basis, when changes to borders are made, when disputes are resolved, new states created, etc.

Uses and limits:

- Uses: This data table can be used to establish the number of dyads currently disputed, the number of dyads that were created through conflict and/or independence. These numbers can be compared to other factors like the stability of the border, deaths on the border, transboundary agreements etc.
- Limits: This data table is limited by its binary nature, leaving no room for descriptive detail. This means that the data table lacks the ability to describe the nature of each data point. For example, the data table does not give information as to the scale or intensity of border disputes or conflicts; it only records their existence. Furthermore, the data table only records dyads currently in dispute, and misses dyads which were once in dispute but have since been resolved.

2.2. Maritime Boundaries.

This dataset provides information about the maritime boundaries of the BIG dyads. The dataset includes data tables detailing the boundary characteristics, and the characteristics of the treaties governing these boundaries.

2.2.1. Maritime Boundaries.

Concept: This data table provides a summary of the maritime boundaries included in the database.

Organizing principles:

- Primary key: **m_id** provides the id number specific to the data table, identifying each unique row in the data table.
 - Values: m_1 and above.
- Foreign key: **dyad_id** organizes the table by country dyads and provides a link to the broader database.
- Foreign key: **mtreaty_id** provides a link to the data table on maritime treaties, with more detail on the treaties detailed here.

Number of indicators | variables: 4 | 11

- Indicator 1: Dyad.
 - Variable 1: **dyad_id** identifies the country-country dyad in question.
 - Type: Numeric.
 - Values: 1001 and above.
- Indicator 2: Maritime boundary characteristics.
 - Variable 1: **m1_treaty** determines whether there is a treaty governing the dyad boundary in question (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.

- Variable 2: **m2_eez** determines whether the maritime boundary is an exclusive economic zone (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888; -999.
- Variable 3: **m3_shelf** determines whether the maritime boundary between the dyad countries is a continental shelf (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888; -999.
- Variable 4: **m4_other** represents whether the maritime boundary is a result of some other legal agreement between the dyad countries (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888; -999.
- Indicator 3: Treaty characteristics.
 - Variable 1: **m5_t_year** provides the year of the most recent treaty between the two dyad countries governing the boundary.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.
 - Variable 2: **mtreaty_id** provides the id number for the most recent treaty governing the boundary. This variable serves as the foreign key linking this data table
 - Type: String.
 - Values: mtreaty_1 and above
 - Variable 3: **m6_multiple** determines whether there are multiple treaties governing different aspects of the dyad boundary in question (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999
- Indicator 4: Maritime boundary conflict.
 - Variable 1: **m7_disputed** determines whether one or both dyad countries on a maritime boundary currently dispute the position of the boundary (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
 - Variable 2: **m8_conflict** represents whether the maritime dyad boundary arose from conflict (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
 - Variable 3: **m9_parties** determines whether there are any other political actors involved in any conflict or dispute over the maritime boundary (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888; -999.

Design and updates:

- Design: This indicator gives more detail on the dyads, measuring the presence of maritime boundaries. In addition, the indicator gives details on the nature of maritime boundaries, and on any conflicts governing these boundaries.
- Updating schedule: These indicators should be updated on an ad hoc basis, whenever changes to maritime boundaries and treaties are made.

Key definitions:

- There are two primary types of *maritime boundaries*. The first are the international boundaries of territorial seas, determined by agreement or treaty, that sit within 12 nautical miles of the shore. Second, there are juridical limits of other kinds of legal spaces, including contiguous zones, exclusive economic zones, and continental shelves.

Uses and limits:

- Uses: This data table can be used to establish both the presence of a maritime boundary, and to establish the details of the boundary. It can be used to track the presence of maritime treaties between dyads, as well as the presence of conflict over maritime boundaries.
- Limits: This data table is limited by its binary nature. The aspects of the dyad are marked only as yes or no, leaving no room for extra information. This means that the data table lacks detail—for example, it does not record how long the maritime boundary is between dyads, only that it exists.

2.2.2. Maritime Treaties.

Concept: This data table provides a summary of the maritime treaties governing the maritime boundaries included in the database.

Organizing principles:

- Primary key: **mtreaty_id** provides the id number specific to the table and organizes each unique row.
 - Values: mtreaty_1 and above.
- Foreign key: **dyad_id** identifies the dyad involved in the relevant treaty.

Number of indicators | variables: 3 | 11

- Indicator 1: Dyad.
 - Variable 1: **dyad_id** identifies the country-country dyad in question.
 - Type: Numeric.
 - Values: 1001 and above.
- Indicator 2: Treaty information.
 - Variable 1: **mtreaty_1** provides the name of the treaty in question.
 - Type: String.
 - Values: Unlimited; -888; -999.

- Variable 2: **dyad_id** provides the dyad ID number of the dyad countries involved in the treaty.
 - Type: Numeric.
 - Values: Unlimited; -888; -999.
- Variable 3: **mtreaty_2** provides the year of the treaty in question.
 - Type: Numeric.
 - Values: Natural numbers; -888; -999.
- Variable 4: **mtreaty_3** determines whether the agreement in question has been fully ratified by the dyad countries (1) or not (0).
 - Type: Boolean.
 - Values: 0 or 1; -888; -999.
- Variable 5: **mtreaty_4** provides whether the treaty in question involves countries other than the dyad in question.
 - Type: Boolean.
 - Values: 0 or 1; -888; -999.
- Indicator 3: Maritime treaty classification.
 - Variable 1: **t_class_1** represents whether the treaty in question is delimiting fishing zones (1) or not (0).
 - Type: Boolean.
 - Values: 0 or 1; -888; -999.
 - Variable 2: **t_class_2** represents whether the treaty in question refers to the governance of resource exploitation (other than fishing) (1) or not (0).
 - Type: Boolean.
 - Values: 0 or 1; -888; -999.
 - Variable 3: **t_class_3** represents whether the treaty in question governs the militarization of the boundary (1) or not (0).
 - Type: Boolean.
 - Values: 0 or 1; -888; -999.
 - Variable 4: **t_class_4** represents whether the treaty in question delimits humanitarian aspects of governance of the boundary (1) or not (0).
 - Type: Boolean.
 - Values: 0 or 1; -888; -999.
 - Variable 5: **t_class_5** represents whether the treaty in question primarily delimits economic aspects of the boundary (1) or not (0).
 - Type: Boolean.
 - Values: 0 or 1; -888; -999.

Design and updates:

- Design: This indicator gives more detail on the treaties governing maritime boundaries. It measures the presence, age, ratification, and classification of treaties, and conflict over them.
- Updating schedule: These indicators should be updated on an ad hoc basis, whenever changes to maritime boundaries and treaties are made. There should, however, be a semi-regular review of maritime treaties to check for updates.

Key definitions:

- Treaties are classified into five different categories, depending on their primary subject matter: fishing, other resource exploitation, militarization, humanitarianism, and economics. Treaties may cover other aspects of boundary governance as well.

Uses and limits:

- Uses: It can be used to track the presence of maritime treaties between dyads, as well as the purpose of those treaties.
- Limits: This data table is limited by its binary nature, and by its reliance on broad classifications.

2.3. Boundary Infrastructures.

This dataset provides an overview of the infrastructure of the dyad boundaries. Included in this dataset, currently, is a data table on the connectivity of the dyads – their cross-border transportation infrastructure. In the future, data tables on border infrastructures and crossings will be added.

2.3.1. Connectivity.

Concept: This indicator provides the counts of cross-border infrastructures, namely roadways, railways and navigable waterways.

Organizing principle:

- Primary key: **infra_id** provides the id number specific to the table and organizes each unique row.
 - Values: infra_1 and above.
- Foreign key: **dyad_id** provides the id number of the dyad involved in the relevant treaty and serves to link this data table to the broader database.

Number of indicators | variables: 4 | 3

- Indicator 1: Dyad.
 - Variable 1: **dyad_id** identifies the country-country dyad in question.
 - Type: Numeric.
 - Values: 1001 and above.
- Indicator 2: Cross-border roads.
 - Variable 1: **infra_1** measures the number of roadways crossing the dyad boundary.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888, -999.
- Indicator 3: Cross-border railways.
 - Variable 1: **infra_2** provides the number of railways crossing the dyad boundary.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888, -999.

- Indicator 4: Cross-border navigable waterways.
 - Variable 1: **infra_3** measures the number of waterways crossing the dyad boundary.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888, -999.

Design and updates:

- Design: these indicators were designed in order to measure the connectivity of dyads, and the level of infrastructure development between dyad countries. These data are collected using publicly available maps and GIS software.
- Updating Schedule: the indicators should be updated on an ad hoc basis, when either the infrastructure in question changes, or the maps and documentation improve.

Use and limits:

- Use: this data table can be used to measure the level of connection and infrastructure development across dyad borders. It can also be used as a measure of porosity across dyads and used as a basis in other comparisons.
- Limits: These data are limited by the quality and reliability of the maps being used. Not all country transportation infrastructures are up to date or well documented. This data table, then, presents the infrastructure data as well as possible.

2.4. Demographics.

The data tables in this dataset present data on borderland population density, and on death rates in the borderlands. In the future, data on deaths crossing borders and on cross-border movement will be added.

2.4.1. Borderland Populations.

Concept: This data table provides an overview of the population density in the borderlands of those countries included in the database.

Organizing principles:

- Primary key: **bp_id** provides the ID number specific to the data table, identifying each unique row in the data table.
 - Values: bp_1 and above.
- Foreign key: **dyad_id** organizes the table by country dyads and provides a link to the broader database.

Number of indicators | variables: 4 | 12

- Indicator 1: Dyad.
 - Variable 1: **dyad_id** identifies the country-country dyad in question.
 - Type: Numeric.
 - Values: 1001 and above.

- Indicator 2: Country 1 borderland population.
 - Variable 1: **b_pop1_1** provides the total population for dyad country 1.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.
 - Variable 2: **b_pop1_2** provides the population of country 1 that lives in borderlands as a number.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.
 - Variable 3: **b_pop1_3** measures the proportion of country 1's population that lives in borderlands.
 - Type: Numeric.
 - Values: Decimal values between 0 and 1; -888; -999.
- Indicator 3: Country 2 borderland population.
 - Variable 1: **b_pop2_1** provides the total population for dyad country 2.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.
 - Variable 2: **b_pop2_2** provides the population of country 2 that lives in borderlands as a number.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.
 - Variable 3: **b_pop2_3** measures the proportion of country 2's population that lives in borderlands.
 - Type: Numeric.
 - Values: Decimal values between 0 and 1; -888; -999.
- Indicator 4: Dyad borderland population.
 - Variable 1: **b_pop3_1** provides the population of country 1 that lives in the borderlands bordering country 2.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.
 - Variable 2: **b_pop3_2** measures b_pop3_1 as a proportion of the total population of country 1.
 - Type: Numeric.
 - Values: Decimal values between 0 and 1; -888; -999.
 - Variable 3: **b_pop3_3** provides the population of country 2 that lives in the borderlands bordering country 1.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.
 - Variable 4: **b_pop3_4** measures b_pop3_3 as a proportion of the total population of country 2.
 - Type: Numeric.
 - Values: Decimal values between 0 and 1; -888; -999.

- Variable 5: **b_pop3_5** provides the total population living in the dyad's borderlands (the sum of b_pop3_1 and b_pop3_3).
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.

Design and updates:

- Design: This data table focuses on the populations of the dyad countries: it measures how densely populated their borderland regions are.
- Updating schedule: This data table should be updated on an ad-hoc basis, whenever updates are made to the source data.

Key definitions:

- The *Nomenclature of territorial units for statistics (NUTS)* is a hierarchical system used by Eurostat to divide territories into units. This data table focuses on the *NUTS3* level, which are smallest regions delimited for socio-economic regions.

Uses and limits:

- Uses: This data table can be used to calculate the concentration of a country's population in its specific borderlands. It can be used to aid in more complicated analyses of borderland development.
- Limits: This data table offers only the population numbers, and cannot shed light on the economic, cultural, or social particularities of borderland populations. This data table is also limited by any potential limits on the source data.

2.5. Economics and Inequality.

Currently, this dataset consists of a data table on national GDP and cross-dyad economic inequality. In the future, data on economic development and trade will be added.

2.5.1. GDP.

Concept: This data table presents data on national GDP and cross-dyad differences in GDP.

Organizing principles:

- Primary key: **gdp_id** provides the ID number specific to the data table, identifying each unique row in the data table.
 - Values: gdp_1 and above.
- Foreign key: **dyad_id** organizes the table by unique country dyads.

Number of indicators | variables: 3 | 7

- Indicator 1: Dyad.
 - Variable 1: **dyad_id** identifies the country-country dyad in question.
 - Type: Numeric.
 - Values: 1001 and above.

- Indicator 2: GDP in US dollars (billions).
 - Variable 1: **gdp_1** measures the GDP of country 1 in US dollars.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.
 - Variable 2: **gdp_2** measures the GDP of country 2 in US dollars.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.
 - Variable 3: **gdp_3** measures the difference in GDP between the two countries in US dollars as an absolute value.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.
- Indicator 3: GDP per capita in US dollars.
 - Variable 1: **gdp_4** measures the GDP per capita of country 1 in US dollars.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.
 - Variable 2: **gdp_5** measures the GDP per capita of country 2 in US dollars.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.
 - Variable 3: **gdp_6** measures the difference in GDP per capita between the two countries in US dollars as an absolute value.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.

Design and updates:

- Design: The variables in this data table are designed to capture dyad-level differences in GDP at the national level and per capita. Inequality in all forms, not least economic, is one of the most important topics in border studies. It intersects with many other border-related topics, such as migration and trade – therefore data on dyad-level differences in GDP is of considerable value for examining relationships between inequality and social, political, and military issues.
- Updating schedule: This data should be updated on a regular basis, as and when new GDP data is made available.

Uses and limits:

- Uses: since inequality intersects with many other border-related topics, the indicators from this data table can be crossed with other data tables to create interesting research questions.
- Limits: as it stands, there is only the latest inequality data in the present data table. As a result, this data table is not useful for longitudinal studies of inequality.

2.6. Dyad Geography.

This dataset includes data tables both organized by dyad and not. These tables include data on transboundary watersheds, peace parks, and mountain ranges. This dataset falls in line with the sustainability theme of the BIG Database project.

2.6.1. Transboundary Watersheds.

Concept: This data table provides a list of the watersheds intersected by the dyads of the BIG database.

Organizing principle:

- Primary key: **ws_id** provides the organizing primary key for this table, identifying each unique row.
 - Values: ws_001 and above.
- Foreign key: **dyad_id** links the watershed to the dyad boundary that crosses it.

Number of indicators | variables: 3 | 49

- Indicator 1: Dyad.
 - Variable 1: **dyad_id** identifies the country-country dyad in question.
 - Type: Numeric.
 - Values: 1001 and above.
- Indicator 2: Watershed characteristics.
 - Variable 1: **ws_name** provides the names of the watershed(s) that the dyad boundary intersects in English.
 - Type: String.
 - Values: Unlimited; -888, -999.
 - Variable 2: **ws_dyad_number** measures the number of dyad boundaries that intersect the watershed in question.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888, -999.
- Indicator 3: Watershed location.
 - Variable 1: **ws_loc1** provides the dyad_id number of first or only dyad whose boundary crosses the watershed in question.
 - Type: Numeric.
 - Values: 1001 and above.
 - Variables 2 through 46: **ws_loc2** through **ws_loc46** provide the dyad_id number of the second dyad whose boundary crosses the watershed in question, where applicable.
 - Type: Numeric.
 - Values: 1001 and above; -888, -999.

Design and updates:

- Design: This data table was designed to support the BIG project's research into sustainability. Finding a central list of well-established watersheds was central to the

data collection for this subset. The UN Global Compact provided a major transboundary dataset that was used as a jumping-off point for the present dataset.

- Design: The number of variables included in indicator 2 is determined by the largest number of dyads intersecting a single watershed. In this case, there are 46 location variables in indicator 2 because watershed number 68 (Danube) is crossed by 46 different dyads.
- Updating schedule: Given that the nature of transboundary watersheds is relatively stable, this data set only needs to be updated every 5 years or so, with the exception of those cases where watershed or dyad boundaries change.

Uses and limits:

- Uses: This table can be used in conjunction with the other tables in this dataset to study the geography of various dyad boundaries. In addition, it can be used to study the sustainability commitments of the BIG dyads.
- Limits: Like the rest of the dataset, this table is focused on the physical geography of the dyad and contains little information about the politics of cross-border sustainability efforts.

2.6.2. Transboundary Peace Parks.

Concept: This data table provides a list of the peace parks intersected by the dyads of the BIG database.

Organizing principle:

- Primary key: **peace_p_id** provides the organizing primary key for this table, identifying each unique row.
 - Values: peace_p_001 and above.
- Foreign key: **dyad_id** links the watershed to the dyad boundary that crosses it.

Number of indicators | variables: 3 | 5.

- Indicator 1: Dyad.
 - Variable 1: **dyad_id** identifies the country-country dyad in question.
 - Type: Numeric.
 - Values: 1001 and above.
- Indicator 2: Peace park characteristics.
 - Variable 1: **peace_p_name** provides the names of the peace parks(s) that the dyad boundary intersects in English.
 - Type: String.
 - Values: Unlimited; -888, -999.
 - Variable 2: **peace_p_dyad_number** measures the number of dyad boundaries that intersect the peace park in question.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888, -999.

- Indicator 3: Peacepark location.
 - Variable 1: **peace_p_loc1** provides the dyad_id number of first or only dyad whose boundary crosses the peace park in question.
 - Type: Numeric.
 - Values: 1001 and above.
 - Variables 2 and above: **peace_p_loc2** and above provide the dyad_id number of the second dyad whose boundary crosses the peace park in question, where applicable.
 - Type: Numeric.
 - Values: 1001 and above; -888, -999.

Design and updates:

- Design: This data table was designed to support the BIG project's research into sustainability. The initial phase of the data collection for this dataset focussed on parks that were intersected with dyads. Classifying different transboundary parks, which was a critical first step, was based on IUCN definitions in their report *Transboundary Conservation: A Systemic and Integrated Approach*.
- Design: The number of variables included in indicator 2 is determined by the largest number of dyads intersecting a single peace park.
- Updating schedule: Given that the nature of transboundary peace parks is relatively stable, this data set only needs to be updated every 5 years or so, with the exception of those cases where peace park or dyad boundaries change.

Uses and limits:

- Uses: This table can be used in conjunction with the other tables in this dataset to study the geography of various dyad boundaries. In addition, it can be used to study the sustainability commitments of the BIG dyads.
- Limits: Like the rest of the dataset, this table is focused on the physical geography of the dyad and contains little information about the politics of cross-border sustainability efforts.

2.6.3. Transboundary Mountains.

Concept: This data table provides a list of the mountains intersected by the dyads of the BIG database.

Organizing principle:

- Primary key: **mount_id** provides the organizing primary key for this table, identifying each unique row.
 - Values: ws_001 and above.
- Foreign key: **dyad_id** links the watershed to the dyad boundary that crosses it.

Number of indicators | variables: 3 | TBD

- Indicator 1: Dyad.
 - Variable 1: **dyad_id** identifies the country-country dyad in question.
 - Type: Numeric.
 - Values: 1001 and above.
- Indicator 2: Mountain characteristics.
 - Variable 1: **mount_name** provides the names of the mountain(s) that the dyad boundary intersects in English.
 - Type: String.
 - Values: Unlimited; -888, -999.
 - Variable 2: **mount_dyad_number** measures the number of dyad boundaries that intersect the mountain in question.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888, -999.
- Indicator 3: Mountain location.
 - Variable 1: **mount_loc1** provides the dyad_id number of first or only dyad whose boundary crosses the mountain in question.
 - Type: Numeric.
 - Values: 1001 and above.
 - Variables 2 and above: **mount_loc2** and above provide the dyad_id number of the second dyad whose boundary crosses the mountain in question, where applicable.
 - Type: Numeric.
 - Values: 1001 and above; -888, -999.

Design and updates:

- Design: This data table was designed to support the BIG project's research into sustainability.
- Design: The number of variables included in indicator 2 is determined by the largest number of dyads intersecting a single mountain.
- Updating schedule: Given that the nature of transboundary mountains is relatively stable, this data set only needs to be updated every 5 years or so, with the exception of those cases where dyad boundaries change.

Uses and limits:

- Uses: This table can be used in conjunction with the other tables in this dataset to study the geography of various dyad boundaries. In addition, it can be used to study the sustainability commitments of the BIG dyads.
- Limits: Like the rest of the dataset, this table is focused on the physical geography of the dyad and contains little information about the politics of cross-border sustainability efforts.

2.6.4. Boundary Geography.

Concept: This data table draws on the three previous tables to provide insight into the geography of the dyad boundaries included in the BIG dyads database.

Organizing principle:

- Primary key: **geo_id** provides the organizing primary key for this table, identifying each unique row.
 - Values: geo_1 and above.
- Foreign key: **dyad_id** organizes the table by country dyads and provides a link to the broader database.

Number of indicators | variables: 4 | 10

- Indicator 1: Dyad.
 - Variable 1: **dyad_id** identifies the country-country dyad in question.
 - Type: Numeric.
 - Values: 1001 and above.
- Indicator 2: Dyad-intersecting watersheds.
 - Variable 1: **geo1_ws** measures whether there is a watershed intersected by dyad boundary (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
 - Variable 2: **geo2_ws** provides a count of the number of watersheds crossed by the dyad boundary.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888, -999.
 - Variable 3: **geo3_ws** measures the total size in km² of all the watersheds intersected by the dyad boundary.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888, -999.
- Indicator 3: Dyad-intersecting peace parks.
 - Variable 1: **geo1_pp** measures whether there is a peace park intersected by dyad boundary (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
 - Variable 2: **geo2_pp** provides a count of the number of peace parks crossed by the dyad boundary.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888, -999.
 - Variable 3: **geo3_pp** measures the total size in km² of all the peace parks intersected by the dyad boundary.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888, -999.

- Indicator 4: Dyad-intersecting mountains.
 - Variable 1: **geo1_m** measures whether there is a mountains intersected by dyad boundary (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
 - Variable 2: **geo2_m** provides a count of the number of mountains crossed by the dyad boundary.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888, -999.
 - Variable 3: **geo3_m** measures the total size in km² of all the mountains intersected by the dyad boundary.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888, -999.

Design and updates:

- Design: This data table brings together the three tables within the sustainability theme (peace parks, watersheds, and mountains) to track the geography of each dyad.
- Updating schedule: Given the physical geography nature of this table, and the dataset to which it belongs, frequent updates are not needed. This table should be updated when and if dyad boundaries change, and/or the boundaries of watersheds or peace parks change.

Uses and limits:

- Uses: This data table can be used to compare the geography of dyad boundaries, and to study the environmental or sustainability commitments of different dyads.
- Limits: This table contains only limited quantitative information about the geographic features of the dyad boundaries and does not shed light on politics of sustainability.

3. The Jean Monnet Network Human to Security Continuum Datasets.

The Jean Monnet Network (JMN) Human to Security Continuum datasets make up a subset of the BIG Dyads database focused specifically on the internal and external boundaries of the European Union. This database project is headed up by the team at the University of Victoria and the research assistants housed there; however, all network partners are integral to this work, both in developing new indicators and undertaking data collection. This particular portion of the data collection efforts was support by funding from the Erasmus+ Program of the European Union.

The ongoing migration crisis in Europe is the worst humanitarian crisis in decades and is forcing Europeans to face past and future issues about borders and security. The policy decisions being made now will have a long-standing impact on the European Union and are

not only reshaping Europe's internal and peripheral borders, but also Europe's values of integration. Moreover, in this era of globalization, much of the policy process around humanitarian aid, migration, and security involve collaboration and cooperation across borders. In light of this, these policy decisions need to be documented, researched, and studied comparatively.

The goal of the network with this project is to create a systematic and comprehensive database on European Integration across each internal and external border dyad from the perspective of human to military security in the EU. The datasets here include over 160 dyad pairs, where either one or both of the dyad countries is an EU member state. Data on a wide range of indicators and variables on the dyads covering all aspects of the human to security continuum, from defense spending to infrastructure continuity to tourism and trade.

3.1. Dyad Characteristics.

This dataset describes the dyads included in the subset of JMN datasets and includes tables on the European Union membership of the dyad countries and details of the accession.

3.1.1. JMN Dyads.

Concept: This data table provides the list of dyads included in the JMN Human to Military Security Continuum data tables and their basic characteristics.

Organizing principle:

- Primary key: **jmn_id** provides the id number specific to the data table and organizes it according to unique row.
 - Values: 6001 and above.
- Foreign key: **dyad_id** identifies the relevant country-country dyad and links the JMN specific dyads to the broader BIG database.

Number of indicators | variables: 2 | 3

- Indicator 1: Dyads.
 - Variable 1: **dyad_id** provides the dyad id from the BIG database for the dyad in question.
 - Type: Numeric.
 - Values: 1001 and above.
- Indicator 2: Dyad characteristics.
 - Variable 1: **jmn_intra** determines whether both of the states on the dyad are EU member states (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
 - Variable 2: **jmn_extra** determines whether one of the states in a dyad is outside the EU and the other is an EU member state (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.

Design and updates:

- Design: these indicators were designed in order to link the EU dyads data and the broader JMN data, and to provide a measurement of where on the EU's external borders the dyads sit.
- Updating Schedule: the indicators should be updated on an ad hoc basis, when the status of states in relation to the European Union changes.

Use and limits:

- Use: this data table can be used to establish on what external borders of the EU the dyad countries sit. These data can also be used as a control when comparing other aspects of the dyads.
- Limits: N/A.

3.1.2. EU Membership.

Concept: This indicator provides an overview of dyad differences in EU membership, including tracking cross country variation membership in the Eurozone and Schengen.

Organizing principle:

- Primary key: **member_id** provides the id number specific to the data table and organizes it according to unique row.
 - Values: mem_001 and above.
- Foreign key: **jmn_id** identifies the relevant country-country dyad.

Number of indicators | variables: 4 | 13

- Indicator 1: Dyad.
 - Variable 1: **jmn_id** identifies the relevant dyad.
 - Type: Numeric.
 - Values: 6001 and above.
- Indicator 2: EU Membership
 - Variable 1: **m1_c1** indicates whether country 1 of the dyad is an EU member state (1) or not (0).
 - Type: Binary.
 - Values: 0, 1; -888, -999.
 - Variable 2: **m1_c2** indicates whether country 2 of the dyad is an EU member state (1) or not (0).
 - Type: Binary
 - Values: 0, 1; -888, -999
 - Variable 3: **m2_c1** provides the year of EU membership of country 1 of the dyad, if applicable
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.

- Variable 4: **m2_c2** provides the year of EU membership of country 2 of the dyad, if applicable.
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.
- Indicator 3: Eurozone Membership
 - Variable 1: **m3_c1** indicates whether country 1 of the dyad is a member of the Eurozone (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
 - Variable 2: **m3_c2** indicates whether country 2 of the dyad is a member of the Eurozone (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
 - Variable 3: **m4_c1** provides the year of Eurozone membership of country 1 of the dyad, if applicable
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.
 - Variable 4: **m4_c2** provides the year of Eurozone membership of country 2 of the dyad, if applicable.
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.
- Indicator 4: Schengen Membership
 - Variable 1: **m5_c1** indicates whether country 1 of the dyad is a member of Schengen (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
 - Variable 2: **m5_c2** indicates whether country 2 of the dyad is a member of Schengen (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
 - Variable 3: **m6_c1** provides the year of Schengen membership of country 1 of the dyad, if applicable
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.
 - Variable 4: **m6_c2** provides the year of Schengen membership of country 2 of the dyad, if applicable.
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.

Design:

- Design: these indicators were designed in order to track differences across dyads in EU membership and integration.
- Updating Schedule: the indicators should be updated on an ad hoc basis, when the status of states in relation to the European Union changes.

Use and Limits:

- Use: this data table can be used to establish the number of dyads with different EU relationships. It can also be used to track the relationship between EU membership and membership in the Eurozone and Schengen. These data can also be used as a control when comparing other aspects of the dyads.
- Limits: this data table is limited by its binary nature, leaving no room for descriptive detail. This means that the data table lacks the ability to describe the nature of each data point. For example, the data does not include a measure of what dyad states are in the process of joining the EU, Eurozone or Schengen.

3.2. External Governance and Security.

This dataset includes information about the external boundaries of the European Union, and about the ways in which the EU is externalizing its security apparatus. To date, the dataset includes tables on the external dyads of the EU, providing dyad IDs for the relationships between the EU as a whole and non-EU countries, and on the implementation of Integrated Border Management (IBM) Agreements.

3.2.1. EU Dyads.

Concept: This data table sets down the list of the dyads between the EU and its neighbouring non-member states and matches them with their dyad ids. These dyad ids are the organizing principle of the database.

Organizing principle:

- Primary key: **eu_id** provides the id number of the dyad, organizing the table by unique rows, and is then used in the other data tables of the dataset as a foreign key to organize the data.
 - Values: 8001 and above.

Number of indicators | variables: 2 | 4

- Indicator 1: Dyads.
 - Variable 1: **eu_1** provides the name of the first entity in the dyad and is by default the value of "EU."
 - Type: String.
 - Values: Unlimited; -888, -999.
 - Variable 2: **eu_2** provides the name of the non-European Union member country in the dyad.
 - Type: String.
 - Values: Unlimited; -888, -999.
- Indicator 2: Boundary characteristics.
 - Variable 1: **eu1_land** determines whether the extra-EU boundary between the dyad countries is a terrestrial boundary (1) or not (0).
 - Type: Binary
 - Values: 0, 1; -888, -999

- Variable 2: **eu2_maritime** determines whether the extra-EU boundary between the dyad countries is a terrestrial boundary (1) or not (0).
 - Type: Binary
 - Values: 0, 1; -888, -999

Design and updates:

- Design: This data table provides the dyads and their id numbers, which are then used as the organizing basis for the database as a whole. The order of the countries is not meaningful, just alphabetical, and neither is the value of the id number.
- Updating schedule: this data table needs to be updated only on an ad hoc basis, when and as dyads are added to the database.

Uses and limits:

- Uses: This data table is used to organize the other data tables by EU-country pairs, forming the organizational basis of this relational database. Furthermore, this data table can be used to separate dyads with different characteristics from one another. It allows for the separate analysis of land dyads and maritime dyads, where the boundary is between the EU and a neighbouring non-EU member state. This data table is helpful both in gaining more detailed information about each dyad and in allowing for smaller categories of dyads for analysis.
- Limits: this data table contains little information about the dyads or dyad countries, simply providing a numerical id number.

3.2.2. EU Externality.

Concept: This indicator provides the connect between external dyads and the EU dyads data table. Only those JMN dyads where one member is a non-EU state are included here.

Organizing principle:

- Primary key: **ext_id** provides the organizing principle of the table, identifying each unique row.
 - Values: ext_001 and above.
- Foreign key: **jmn_id** provides the JMN dyad ID.
- Foreign key: **eu_dyad_id** provides the dyad ID from the EU dyads data table.

Number of indicators | variables: 1 | 3

- Indicator 1: EU Membership
 - Variable 1: **jmn_id** provides the jmn_id identifying the dyad in question.
 - Type: Numeric.
 - Values: 6001 and above.
 - Variable 2: **eu_dyad_id** provides the EU dyad ID from the EU dyads data table, where applicable.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888, -999.

Design and updates:

- Design: these indicators were designed in order to link the EU dyads data and the broader JMN data, and to provide a measurement of where on the EU's external borders the dyads sit.
- Updating Schedule: the indicators should be updated on an ad hoc basis, when the status of states in relation to the European Union changes.

Use and limits:

- Use: this data table can be used to establish on what external borders of the EU the dyad countries sit. These data can also be used as a control when comparing other aspects of the dyads.
- Limits: this data table is limited by its binary nature, leaving no room for descriptive detail. This means that the data table lacks the ability to describe the nature of each data point. For example, the data does not include a measure of what dyad states are in the process of joining the EU.

3.2.3. Integrated Border Management Agreements.

Concept: These indicators measure the presence of Integrated Border Management (IBM) Agreements between the EU and third countries, and whether these agreements have been renegotiated.

Organizing principle:

- Primary key: **ibm_id** provides the organizing primary key for this table, identifying each unique row.
 - Values: geo_1 and above.
- Foreign key: **eu_dyad_id** organizes the table by EU-country dyads and provides a link to the rest of the dataset.

Number of indicators | variables: 3 | 6

- Indicator 1: Presence of an EU IBM Agreement with Frontex.
 - Variable 1: **ibm_1** measures whether a country has signed a working agreement with Frontex (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1, -888, -999.
 - Variable 2: **ibm_2** provides the year in which the agreement with Frontex was signed.
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.
- Indicator 2: Renegotiation of an EU IBM Agreement with Frontex
 - Variable 1: **ibm_3** measures whether a country has renegotiated their working agreement with Frontex (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1, -888, -999.

- Variable 2: **ibm_4** provides the year in which the agreement with Frontex was renegotiated.
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.
- Indicator 3: The inclusion of ‘search and rescue operations’ in the EU IBM Agreement with Frontex.
 - Variable 1: **ibm_5** measures whether the original working IBM agreement between a country and Frontex mentions ‘search and rescue operations’ (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1, -888, -999.
 - Variable 2: **ibm_6** measures whether the renegotiated working IBM agreement between a country and Frontex mentions ‘search and rescue operations’ (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1, -888, -999.

Design and updates:

- Design: The goal of this data is to determine the number of IBM agreements between the EU and non-EU states, in order to better understand the management of EU borders. In the context of the European Union, “integrated border management” (IBM) refers to a specific border policy implemented by the European Border and Coast Guard agency (also known as “Frontex”). Frontex has put in place “working arrangements” with 18 third countries, and 2 international organizations (the Commonwealth and the Migration, Asylum, Refugees Regional Initiative (MARRI)). These working arrangements ([available here](#)) will be the main source of data collection for setting these indicators.
- Updating schedule: These indicators should be updated on an ad hoc basis, whenever changes to IBM agreements are made.

Uses and limits:

- Uses: This data can be used to determine the presence of an IBM agreement between the EU and a third country, and to measure the level of cooperation between the EU and non-EU states.
- Limits: As the concept of IBM is extremely ambiguous (see the literature review on the topic), the priority is to determine which dyad is managed and which is not through an EU IBM. Whereas sometimes EU institutions refer to border cooperation programs implemented within the EU as “IBM”, and that Frontex is also working to implement IBM within the Schengen Area (which does not fit the borders of the EU), it is important to stress that this proposal focuses solely on the programs implemented by Frontex to manage the **external borders of the EU**, in cooperation with EU Member-States and what the EU calls “third countries” (States that are not Members of the EU).

3.2.4. Criminalization of Solidarity.

Concept: This data table provides a broad view of the laws criminalizing solidarity across states involved in EUropean Integrated Border Management (EIBM).

Organizing principle:

- Primary key: **solidarity_id** provides the organizing primary key for this table, identifying each unique row.

Numbers of indicators | variables: 4 | 11

- Indicator 1: Country characteristics.
 - Variable 1: **country** provides the name of the relevant country, in English.
 - Type: String.
 - Values: Unlimited.
 - Variable 2: **solidarity_1** measures whether the country in question has signed the 1951 Convention on Refugees (1) or not (0).
 - Type: Binary.
 - Values: 0, 1; -888; -999.
 - Variable 3: **solidarity_2** provides the date marking the beginning of the relevant country's involvement in the EU border regime.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.
- Indicator 2: Presence of a law criminalizing solidarity.
 - Variable 1: **solidarity_3** measures whether there is a law in effect that considers it a criminal offence to aid someone to enter, to stay, or to exit the country, regardless of any intention to gain direct or indirect benefits (1) or not (0).
 - Type: Binary.
 - Values: 0,1; -888; -999.
 - Variable 2: **solidarity_4** records the data of the last update to the relevant legal articles/sections.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.
- Indicator 3: Characteristics of the law criminalizing solidarity.
 - Variable 1: **solidarity_5** measures whether the law requires that there be a financial motive for aiding someone to enter, stay, or exit to be considered a crime (1) or not (0).
 - Type: Binary.
 - Values: 0,1; -888; -999.
 - Variable 2: **solidarity_6** measures whether the law provides an exemption based on humanitarian or familial grounds (1) or not (0).
 - Type: Binary.
 - Values: 0,1; -888; -999.

- Indicator 4: Sanctions established in the law criminalizing solidarity.
 - Variable 1: **solidarity_7** provides the minimum fine (in USD) for facilitation-related crimes, excluding professional negligence.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.
 - Variable 2: **solidarity_8** measures the minimum prison sentence (in months) for facilitation-related crimes, excluding professional negligence.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.
 - Variable 3: **solidarity_9** measures the maximum fine (USD) for facilitation-related crimes, considering aggravating circumstances such as involvement of organized groups, death/injuries of the person facilitated, facilitation of minors, family members, women, other groups whose autonomy is denied, and (ab)use of function, but excluding coercion and exploitation.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.
 - Variable 4: **solidarity_10** measures the maximum prison sentence (in months) for facilitation-related crimes, considering aggravating circumstances such as involvement of organized groups, death/injuries of the person facilitated, facilitation of minors, family members, women, other groups whose autonomy is denied, and (ab)use of function, but excluding coercion and exploitation.
 - Type: Numeric.
 - Values: Natural numbers > 0; -888; -999.

Design and updates:

- Design: The states included in this data table are pulled from the three sources: 1) EU member-states and Schengen signatories, 2) signatories of EIBM “working agreements” and 3) Frontex’s “[Beyond EU borders](#)” partnering states. The data was collected from each state’s legal regime, whether the relevant text was the constitution, an ordinance, the penal code, or else.
- Updating schedule: This data table should be updated on an ad-hoc basis as changes to the legal frameworks in question are made. Data should be reviewed yearly to keep up with the legal reforms.

Key definitions:

- The *criminalization of solidarity* entails discourses, norms and practices that turn into a crime the fact of helping people that are “illegalized” by border policies to enter/stay/exit a state, more specifically to search and rescue people at sea, provide shelter, attempt to stop deportation, providing food, water and clothes. This table focuses on the legal dimensions of the criminalization of solidarity.
- The *beginning of involvement with the EU border regime* is measured differently for EU and non-EU member countries. For EU and IBM-signatory countries, this date refers to the earliest date of either the country’s adhesion/signature of the Schengen

agreement, signature of the IBM agreement, demand for adhesion to the EU, or border management program. For countries enrolled in border-building Frontex-led programs, it refers to the earliest one.

- *Facilitation-related crime* refers to any actions related to helping someone enter, stay, or exit the country that are considered to be criminal offences.
- Often, laws specify *aggravating circumstances* as legal conditions that result in increased sanctions. These may be either cumulative or not, depending on the case.

Uses and Limits:

- **Uses:** This data table is used to compare and measure the legal frameworks adopted by the states involved in European Integrated Border Management (EIBM). It provides details on how solidarity is defined, eventual exemptions, and the levels of sanctions.
- **Limits:** This data table is limited to the legal framework, not its application. There are significant variations between what is adopted by law, the practices of legal enforcement, and the decisions of tribunals.

3.3. European Elections and Radical Right Representation.

This dataset includes a set of tables tracking European Parliament elections and the rise of radical right representation in the EP. Going forward, data will be added on national elections across the European Union Member States and cross-country variation in the growth of the radical right.

3.3.1. European Radical Right Parties.

Concept: This data table provides an overview of the radical right parties of Europe, including their names, countries of origin, and activity.

Organizing principle:

- **Primary key: party_ID** provides the ID number specific to the data table and organizes the table by unique rows.
 - Values: party_001 and above.

Number of indicators | variables: 3 | 8

- **Indicator 1: Party location.**
 - **Variable 1: rr_country** provides the name in English of the country where the political party in question is operating.
 - Type: String.
 - Values: Unlimited; -888, -999
- **Indicator 2: Party name and abbreviation.**
 - **Variable 1: party_name** provides the name of the radical right party in question, in the native language.
 - Type: String.
 - Values: Unlimited; -888, -999.

- Variable 2: **party_name_eng** provides the name of the radical right party in question in English.
 - Type: String.
 - Values: Unlimited; -888, -999.
- Variable 3: **party_name_abbr** provides the official abbreviation of the name of the radical right party in question, as it would be shown in electoral results.
 - Type: String.
 - Values: Unlimited; -888, -999.
- Indicator 3: Party activity.
 - Variable 1: **year_found** provides the year of founding for the radical right party in question.
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.
 - Variable 2: **rr_active** reports whether the party in question is still actively running in elections (1) or not (0).
 - Type: Boolean.
 - Values: 0, 1; -888, -999.
 - Variable 3: **year_dissolve** reports the year that the radical right party was dissolved, where applicable.
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.
 - Variable 4: **nat_elec** reports whether the party holds seats in the current session of the national legislature (1) or not (0).
 - Type: Boolean.
 - Values: 0,1; -888, -999.
 - Variable 5: **ep_elec** reports whether the party holds seats in the current session of the European Parliament (1) or not (0).
 - Type: Boolean.
 - Values: 0,1; -888, -999.

Design and updates:

- Design: The parties included in this data table are pulled from the database of [PopuList](#). The PopuList tracks populist, far right, far left and Eurosceptic parties across Europe. Their data table includes those parties who either won at least one seat, or at least 2% of the national vote, in each national and European election year, beginning in 1989. For the purposes of this data table, only those parties determined to be ‘far right’ were selected.
- Updating schedule: This data table should be updated on an ad-hoc basis, as and when new parties are founded, old parties dissolve, and elections occur at national and European levels.

Key definitions:

- This data table includes those parties defined as far right by the PopuList, where far right parties are parties that are “nativist (which is an ideology that holds that states

should be inhabited exclusively by members of the native group and that nonnative elements are fundamentally threatening to the homogenous nation-state) and authoritarian (which is the belief in a strictly ordered society, in which infringements of authority are to be punished severely)” (Mudde 2007).

Uses and Limits:

- **Uses:** This data table, detailing the radical right political parties of Europe, is used to provide detail to the data tables on national and European elections.
- **Limits:** This data table is limited in its numeric nature, and in its brevity. While it provides a useful geography and timeline of the radical right in Europe – by detailing the countries and activity levels – it does not offer any insight into the particularities of the parties. There is significant variation in the fiscal and social politics of the radical right, and here parties that may differ significantly in these dimensions are grouped together.

3.3.2. European Parliament Elections.

Concept: This data table tracks the electoral results of the European radical right across European Parliamentary elections, by country.

Organizing principle:

- **Primary key: `election_ID`** provides the ID number specific to the data table and organizing it according to unique rows.
 - Values: `elec_001` and above.
- **Foreign key: `party_ID`** provides a link to the data table on radical right parties.

Number of indicators | variables: 4 | 12

- **Indicator 1: Location characteristics.**
 - Variable 1: **`country`** provides the name of the country in question.
 - Type: String.
 - Values: Unlimited; -888, -999.
 - Variable 2: **`region`** provides the country’s Eurovoc region.
 - Type: String.
 - Values: north, south, west, east; -888, -999.
- **Indicator 2: Election characteristics.**
 - Variable 1: **`elec_year`** reports the year of the European Parliament election in question.
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.
 - Variable 2: **`vote_turnout`** reports the country-level voter turnout in the relevant European Parliament election.
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.

- Variable 3: **elec_seat** reports the number of seats up for election in the relevant European Parliament election.
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.
- Indicator 3: Results and representation.
 - Variable 1: **women** reports the number of women elected to the European Parliament in the relevant election.
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.
 - Variable 2: **rr_seat** reports the number of candidates affiliated with a radical right party elected to the European Parliament in the relevant election.
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.
 - Variable 3: **rr_women** reports the number of women affiliated with a radical right party elected to the European Parliament in the relevant election.
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.
- Indicator 4: Party and political group characteristics.
 - Variable 1: **rr_party_1** provides the party_id of the radical right party with the largest seat share from that country in that particular election year, if applicable.
 - Type: String.
 - Values: party_001 and above; -888, -999.
 - Variable 2: **rr_party_2** provides the party_id of the radical right party with the second largest seat share from that country in that particular election year, if applicable.
 - Type: String.
 - Values: party_001 and above; -888, -999.
 - Variable 3: **group_1** provides the abbreviations for the political group with which rr_party_1 is affiliated, if applicable.
 - Type: String.
 - Values: Unlimited; -888, -999.
 - Variable 4: **group_2** provides the abbreviations for the political group with which rr_party_1 is affiliated, if applicable.
 - Type: String.
 - Values: Unlimited; -888, -999.

Design:

- Design: Data for this table was pulled from the website and archives of the European Parliament. Drawing on these sites, and other resources, this data table provides an overview of radical right electoral representation in the European Parliament, beginning in 1979.
- Updating schedule: This data table should be updated every 5 years, when elections to the European Parliament are held.

Key Definitions:

- The region of each dyad country in this data table is based on the geographic concept scheme outlined in EuroVoc (the official thesaurus of the European Union). In this scheme, there are four regions in Europe: Western Europe; Central and Eastern Europe; Northern Europe; and Southern Europe.
- Members of the European Parliament are organized into political groups based on ideological affiliation, rather than national origin. These groups function similarly to parties and have their own internal organization and produce motions and legislative proposals.
- The following political groups are included in the data table as they, at one time or another, have housed parties belonging to the radical right:
 - NI: Non-Inscrit (Unaffiliated with a group)
 - DEP: European Progressive Democrats (1973-1984)
 - DR: European Right (1989-1994)
 - ELDR: Group of the European Liberal Democrat and Reform Party (1994-2004)
 - UPE: Union for Europe (1995-1999)
 - TDI: Technical Group of Independent Members (1999-2001)
 - EDD: Europe of Democracies and Diversities (1999-2004)
 - EPP-ED: Group of the European People's Party and European Democrats (1999-2009)
 - UEN: Union for Europe of the Nations Group (1999-2009)
 - IND/DEM: Independence/Democracy Group (2004-2009)
 - EFD: Europe of Freedom and Democracy Group (2009-2014)
 - ECR: European Conservatives and Reformists (2009-ongoing)
 - EPP: European People's Party (2009-ongoing)
 - EFDD: Europe of Freedom and Direct Democracy Group (2014-2019)
 - ENF: Europe of Nations and Freedom (2015-2019)
 - IDG: Identity and Democracy Group (2019-2024)
 - PfE: Patriots for Europe (2024 – ongoing)
 - ESN: Europe of Sovereign Nations (2024 – ongoing)

Uses and Limits:

- Uses: This data table can be used to track the electoral representation of the radical right across European Union member states and European Parliament election years. It also forms the basis for the comparison of radical right seat share used in the data table on dyad-level differences in radical right representation.
- Limits: This data table is limited in its focus on European Parliament election years. It does not capture radical right activity happening at other levels of government, nor does it capture radical right activity happening in European countries that are not European Union member states.

3.3.3. Radical Right Representation.

Concept: This data table provides a broad view of the dyad-level variations in the electoral results for the radical right in European Parliament elections, beginning in 1979.

Organizing principle:

- Primary key: **rep_ID** provides the ID number specific to the data table.
 - Values: rep_001 and above.
- Foreign key: **jmn_ID** organizes the table by dyad country pairs and provides a link to the broader database.
- Foreign key: **election_ID** provides a link to the data table on individual elections, which contain more detail on each election.

Number of indicators | variables: 4 | 11

- Indicator 1: Dyad and election characteristics.
 - Variable 1: **jmn_id** identifies the relevant dyad.
 - Type: Numeric
 - Values: 6001 and above.
- Indicator 2: Election characteristics.
 - Variable 1: **elec_year** provides the year of the elections in question.
 - Type: Numeric.
 - Values: Natural numbers >0; -888, -999.
 - Variable 2: **elec_id_2** provides the election_id for the relevant European Parliament election in country 2.
 - Type: String.
 - Values: elec_001 and above.
- Indicator 3: Country 1 characteristics.
 - Variable 1: **elec_id_1** provides the election_id for the relevant European Parliament election in country 1.
 - Type: String.
 - Values: elec_001 and above.
 - Variable 2: **region_1** provides the region of Europe for country 1.
 - Type: String.
 - Values: west, north, east, south; -888; -999.
 - Variable 3: **rr_share_1** provides the share of country 1's MEPs who belong to radical right political parties as a proportion of the total allocated MEPs.
 - Type: Numeric.
 - Values: 0 to 1; -888; -999.
- Indicator 4: Country 2 characteristics.
 - Variable 1: **elec_id_2** provides the election_id for the relevant European Parliament election in country 2.
 - Type: String.
 - Values: elec_001 and above.

- Variable 2: **region_2** provides the region of Europe for country 2.
 - Type: String.
 - Values: west, north, east, south; -888; -999.
- Variable 3: **rr_share_2** provides the share of country 2's MEPs who belong to radical right political parties as a proportion of the total allocated MEPs.
 - Type: Numeric.
 - Values: 0 to 1; -888; -999.
- Indicator 5: Dyad-level differences in representation.
 - Variable 1: **shared_region** measures whether the two countries of the dyad are in the same region of Europe (1) or not (0).
 - Type: Boolean.
 - Values: 0,1; -888, -999.
 - Variable 2: **rr_share_diff** measures the differences between the two dyad countries in the proportion of seats held by radical right MEPs as an absolute value.
 - Type: Numeric.
 - Values: 0 to 1; -888, -999.

Design:

- Design: This data table is designed to track dyad-level differences in radical right representation at the European level, and to track changes in these differences over time. In addition, the differentiating between regions allows for a comparison of radical right electoral success across parts of the European Union.
- Updating schedule: These data should be updated as and when there are European Parliament elections (on a five-year basis).

Key Definitions:

- The region of each dyad country in this data table is based on the geographic concept scheme outlined in EuroVoc (the official thesaurus of the European Union). In this scheme, there are four regions in Europe: Western Europe; Central and Eastern Europe; Northern Europe; and Southern Europe.

Uses and Limits:

- Uses: This data can be used to study the growth of the radical right, and to track its electoral success across election years. In addition, it can be used as the basis for studying variations across the European Union in representation of extreme political parties.
- Limits: This data is limited by its numeric nature; for example, it does not capture variations in the extremeness of the radical right MEPs. In addition, it only measures the representation level of the radical right (as per PopuList), and so does not capture other extreme or right-wing groups.

4. Updating Schedule.

Data tables in the BIG Dyads Database follow two kinds of updating schedules. The majority of data tables only need to be updated on an ad-hoc basis, whenever changes are made. In these cases, database research assistants should review the data every five to ten years to check for any changes in the indicators. The lists below include information on when the last data collection/review took place. For the second category of data tables, those that need to be updated on a set schedule, the data of next collection is also included.

4.1. Ad-Hoc Updates.

- [Dyads](#) (2.1.1): This data table needs to be updated when (1) dyads are added to the data table, when (2) the UN recognition of boundaries and when (3) countries change their OSCE affiliation. The last period of data collection was conducted in **2024**.
- [Dyad Foundations](#) (2.1.2): This data table needs to be updated only on an ad hoc basis, when changes to dyads are made. The last period of data collection was conducted in **2022**.
- [Dyad Dates](#) (2.1.3): This data table should be updated on an ad-hoc basis, as changes to the dyad boundaries and their governing treaties are made. The last period of data collection was conducted in **2018**.
- [Disputes and Conflicts](#) (2.1.4): The indicators in this table should be updated on an ad hoc basis, when changes to borders are made, when disputes are resolved, new states created, etc. The last period of data collection was conducted in **2021**.
- [Maritime Boundaries](#) (2.2.1): These indicators should be updated on an ad hoc basis, whenever changes to maritime boundaries and treaties are made. The last period of data collection was conducted in **2024**.
- [Maritime Treaties](#) (2.2.2): The maritime treaties data table should be reviewed every 5 years or so to check for changes to the treaties governing the maritime boundaries between dyads. The last period of data collection was conducted in **2024**.
- [Connectivity](#) (2.3.1): These indicators should be updated on an ad hoc basis, when either the infrastructure in question changes, or the maps and documentation improve. The last period of data collection was conducted in **2024**.
- [Transboundary Watersheds](#) (2.6.1): Given that the nature of transboundary watersheds is relatively stable, this data set only needs to be updated every 5 years or so, with the exception of those cases where watershed or dyad boundaries change. The last period of data collection was conducted in **2018**.
- [Transboundary Peace Parks](#) (2.6.2): Given that the nature of transboundary peace parks is relatively stable, this data set only needs to be updated every 5 years or so, with the exception of those cases where peace park or dyad boundaries change. The last period of data collection was conducted in **2018**.
- [Transboundary Mountains](#) (2.6.3): Given that the nature of transboundary mountain positions is relatively stable, this data set only needs to be updated every 5 years or so, with the exception of those cases where mountains or dyad boundaries change. The last period of data collection was conducted in **2018**.

- [Boundary Geography](#) (2.6.4): This data table builds off of the other three in the Dyad Geography dataset and only needs to be updated on an ad-hoc basis when any of the data in the other tables is changed.
- [JMN Dyads](#) (3.1.1): This data table only needs to be updated when (1) new dyads are added to the data table, and when (2) countries change their EU affiliation. The last period of data collection was conducted in **2023**.
- [EU Membership](#) (3.1.2): This data table only needs to be updated on an ad-hoc basis, when and if countries change their membership in the EU, the Eurozone, or Schengen. The last period of data collection was conducted in **2023**.
- [EU Dyads](#) (3.2.1): This data table only needs to be updated when (1) new dyads are added to the data table, and when (2) countries change their EU affiliation. The last period of data collection was conducted in **2023**.
- [EU Externality](#) (3.2.2): This data table only needs to be updated when (1) new dyads are added to the data table, and when (2) countries change their EU affiliation. The last period of data collection was conducted in **2023**.
- [Criminalization of Solidarity](#) (3.2.4): This data should be updated on an ad-hoc basis, when and if changes are made to the legal regimes governing movement across borders. The last period of data collection was conducted in **2024**.
- [European Radical Right Parties](#) (3.3.1): This data table should be updated on an ad-hoc basis, every three to five years. The indicators will need to be updated as and when new parties emerge or old parties fold. The last period of data collection was conducted in **2023**.

4.2. Scheduled Updates.

- [Borderland Populations](#) (2.4.1): Population numbers are updated frequently by individual countries, often on a yearly basis. It will be adequate for our purposes to update the population table every two years. The last data collection period was in **2024**, and the next update should take place in **2026**.
- [GDP](#) (2.5.1): While GDP numbers are updated every year, it will be adequate for our purposes to update the GDP data table every two years. The last data collection period was in **2024**, and the next update should take place in **2026**.
- [Integrated Border Management Agreements](#) (3.2.3): Given the rapid growth of the Frontex's reach and responsibility, this data table needs to be reviewed and updated more often than most, roughly every two years. The last data collection period was in **2022**, and the next update should take place in **2024**.
- [European Parliament Elections](#) (3.3.2): These indicators need to be updated on a five-year basis, whenever there is a European Parliamentary election. The last data collection period was in **2024**, and the next update should take place in **2029**.
- [Radical Right Representation](#) (3.3.3): These indicators need to be updated on a five-year basis, whenever there is a European Parliamentary election. The last data collection period was in **2024**, and the next update should take place in **2029**.

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6. Appendices.

6.1. BIG Network Partners.

The Borders in Globalization Project, of which the Database is one piece, involves a large and diverse network of academic partners and partner organizations. Beyond those groups, we train and mentor large numbers of student research assistants at the undergraduate and graduate levels. Below are listed our partners, up to date as of **June 2024**.

6.1.1. Academic Partners.

Our academic partners are the core of our research program. They are established scholars based at research and teaching institutions worldwide. They produce original research, recruit and supervise students, participate in the governance structures of the program, and help guide the overall direction of the research agenda.

- Edward Boyle (Internal Research Center for Japanese Studies).
- Jeff Ganohalidoh Corntassel (University of Victoria).
- Adriana Dorfman (Federal University of Rio Grande do Sul).
- Frédéric Lasserre (Laval University).
- Christian Leuprecht (Queen's University | Royal Military College of Canada).
- Val Napoleon (University of Victoria).
- Heather Nicol (Trent University).
- Stéphane Roussel (École nationale d'Administration publique).
- Ricahrd St. Marseille (Canada Border Services Agency).
- Laurie Trautman (Western Washington University).
- Dhananjay Tripathi (South Asian University).
- Élisabeth Vallet (University of Quebec at Montreal).

- Martin van der Velde (Radboud University Nijmegen).
- Birte Wassenberg (University of Strasbourg).

6.1.2. Partner Organizations.

We are partnered with a number of non-university organizations who participate in various objectives including: the deliver our research to their policy networks; to ensure knowledge sharing by facilitating education, communication, and engagement with Indigenous networks so as to build new partnerships; and to mobilize knowledge for both academic and non-academic audiences.

- Association of European Border Regions.
- Border Policy Research Institute.
- Canada Border Service Agency.
- DECHINTA: Centre for Research and Learning.
- MDPI Books.
- Mission Opérationnelle Transfrontalière.
- Pacific Northwest Economic Region.
- Pacific Peoples' Partnership.
- Transfrontier Euro-Institut Network.
- World Customs Organization.

6.1.3. Students & Fellows.

Mentorship and training are core parts of our research program. Undergraduate students, graduate students, and post-doctoral scholars are engaged in all aspects of our research activities and will be individually mentored by an academic partner within our network. BIG offers student fellowships at the University of Victoria, as well as at all our partner institutions around the world.

- Braelynn Abercrombie, Indigenous Coordinator.
- Andrew Ambers, Graduate Research Assistant.
- Anna Perez Verdia Bayne, Research Assistant.
- Claude Beaupré, Graduate Student Fellow.
- Shoukia van Beek, Graduate Student Fellow.
- Matt Britton, Graduate Research Assistant.
- Maria Sigridur Finnsdottir, Post-Doctoral Fellow.
- Giulia Gagliano-Tsuda, Graduate Research Assistant.
- Nadine Graham, Graduate Student Fellow.
- Justine Gruau, Graduate Student Fellow.
- Edwin Hodge, Post-Doctoral Fellow.
- Andrzej Jakubowski, Cross-Border Fellow.
- Kalpana Jha, Graduate Student Fellow.
- Maya Krieger, Research Assistant.
- Nick Megoran, Visiting Fellow.
- Luca Nemet, Communications and Administration Assistant.

- Michael O’Shea, Cross-Border Fellow.
- Benjamin Perrier, Post-Doctoral Fellow.
- Shanzae Sarwar, Graduate Research Assistant.
- Tatiana Shaban, Post-Doctoral Fellow.
- Jules Soupault, Graduate Student Fellow.
- Peter Swartz, Non-Academic Fellow.

6.1.4. Team Members.

Our team members are the people who ensure the organization flow and coherency of the research program. Our team members are housed at the University of Victoria.

- Emmanuel Brunet-Jailly. Project Director.
- Michael Carpenter. Managing Editor, BIG Review.
- Jeff Corntassel. Co-Principal Investigator, Pillar 1: Indigenous Internationalism and Nationhood.
- Heather Currie. Research Program Manager.
- Benjamin Perrier. Host, BIG_Podcasts.

6.2. List of Dyads.

Country 1	Country 2	Dyad ID	Country 1	Country 2	Dyad ID
Abkhazia	Georgia	1001	France	Germany	1402
Abkhazia	Georgia	1002	France	Italy	1404
Abkhazia	Russia	1003	France	Italy	1405
Abkhazia	Russia	1004	France	Luxembourg	1407
Abkhazia	Turkey	1005	France	Germany	1401
Afghanistan	China	1006	France	Germany	1402
Afghanistan	Iran	1007	France	Italy	1404
Afghanistan	Pakistan	1008	France	Italy	1405
Afghanistan	Tajikistan	1009	France	Luxembourg	1407
Afghanistan	Turkmenistan	1010	France	Monaco	1408
Afghanistan	Uzbekistan	1011	France	Monaco	1409
Akrotiri--UK	Cyprus	1012	France	Spain	1410
Akrotiri--UK	Cyprus	1013	France	Spain	1411
Albania	Greece	1014	France	Switzerland	1412
Albania	Greece	1015	France	United Kingdom	1413
Albania	Italy	1016	France	United Kingdom	1414
Albania	Kosovo	1017	France	Guernsey--UK	1403
Albania	North Macedonia	1020	France	Jersey--UK	1406
Albania	Montenegro	1018	French Guiana--FRA	Suriname	1415
Albania	Montenegro	1019	French Guiana--FRA	Suriname	1416
Algeria	Libya	1022	French Polynesia--FRA	Kiribati	1417

Algeria	Mali	1023	French Polynesia--FRA	Pitcairn Islands--UK	1418
Algeria	Mauritania	1024	Gabon	Sao Tome and Principe	1419
Algeria	Morocco	1025	Gambia	Senegal	1420
Algeria	Morocco	1026	Gambia	Senegal	1421
Algeria	Niger	1027	Georgia	Russia	1422
Algeria	Tunisia	1029	Georgia	Russia	1423
Algeria	Tunisia	1030	Georgia	South Ossetia	1424
Algeria	Western Sahara	1031	Georgia	Turkey	1425
Algeria	Italy	1021	Georgia	Turkey	1426
Algeria	Spain	1028	Germany	Luxembourg	1427
American Samoa--USA	Cook Islands--NZ	1032	Germany	Netherlands	1428
American Samoa--USA	Niue--NZ	1033	Germany	Netherlands	1429
American Samoa--USA	Tokelau--NZ	1035	Germany	Poland	1430
American Samoa--USA	Samoa	1034	Germany	Poland	1431
American Samoa--USA	Tonga	1036	Germany	Sweden	1432
American Virgin Islands--US	Venezuela	1037	Germany	Switzerland	1433
American Virgin Islands--USA	Saba--NDL	1039	Germany	United Kingdom	1434
American Virgin Islands--USA	Puerto Rico--USA	1038	Ghana	Togo	1435
Andaman and Nicobar Islands--IND	Myanmar	1040	Ghana	Togo	1436
Andorra	France	1041	Gibraltar--UK	Morocco	1437
Andorra	Spain	1042	Gibraltar--UK	Spain	1438
Angola	DR Congo	1045	Gibraltar--UK	Spain	1439
Angola	DR Congo	1046	Glorioso Islands--FRA	Madagascar	1440
Angola	Namibia	1047	Glorioso Islands--FRA	Mayotte	1441
Angola	Namibia	1048	Glorioso Islands--FRA	Seychelles	1442
Angola	Congo	1043	Greece	Libya	1444
Angola	Congo	1044	Greece	Italy	1443
Angola	Zambia	1049	Greece	North Macedonia	1445
Anguilla--UK	Antigua and Barbuda	1051	Greece	Turkey	1446
Anguilla--UK	Saint Martin--FRA	1055	Greece	Turkey	1447
Anguilla--UK	Saint Barthelemy--FRA	1054	Greenland--DNK	Iceland	1448
Anguilla--UK	Saba--NDL	1053	Greenland--DNK	Jan Mayen--NOR	1449
Anguilla--UK	British Virgin Islands--UK	1052	Greenland--DNK	Svalbard--NOR	1450
Anguilla--UK	American Virgin Islands--USA	1050	Grenada	Saint Vincent and Grenadines	1451
Antigua and Barbuda	Montserrat--UK	1057	Grenada	Trinidad and Tobago	1452
Antigua and Barbuda	Saint Barthelemy--FRA	1058	Grenada	Venezuela	1453
Antigua and Barbuda	Guadeloupe--FRA	1056	Guadeloupe--FRA	Montserrat--UK	1454

Antigua and Barbuda	Saint Kitts and Nevis	1059	Guadeloupe--FRA	Venezuela	1455
Argentina	South Georgia and South Sandwich Islands--UK	1065	Guam--USA	Northern Mariana Islands--USA	1456
Argentina	Bolivia	1060	Guatemala	Honduras	1457
Argentina	Brazil	1061	Guatemala	Honduras	1458
Argentina	Chile	1062	Guatemala	Mexico	1459
Argentina	Paraguay	1064	Guatemala	Mexico	1460
Argentina	Falkland Islands--UK	1063	Guernsey--UK	Jersey--UK	1461
Argentina	Uruguay	1066	Guinea	Guinea-Bissau	1462
Argentina	Chile	1067	Guinea	Guinea-Bissau	1463
Argentina	Uruguay	1068	Guinea	Liberia	1464
Armenia	Artsakh	1069	Guinea	Mali	1465
Armenia	Azerbaijan	1070	Guinea	Senegal	1466
Armenia	Georgia	1071	Guinea	Sierra Leone	1467
Armenia	Iran	1072	Guinea	Sierra-Leone	1468
Armenia	Turkey	1073	Guinea-Bissau	Senegal	1469
Artsakh	Azerbaijan	1074	Guinea-Bissau	Senegal	1470
Aruba--NDL	Dominican Republic	1075	Guyana	Suriname	1471
Aruba--NDL	Venezuela	1076	Guyana	Suriname	1472
Australia	Kerguelen--FRA	1078	Guyana	Trinidad and Tobago	1473
Australia	Timor-Leste	1082	Guyana	Venezuela	1474
Australia	Indonesia	1077	Guyana	Venezuela	1475
Australia	New Caledonia--FRA	1079	Haiti	Jamaica	1476
Australia	Papua New Guinea	1080	Haiti	Turks and Caicos Islands--UK	1478
Australia	Solomon Islands	1081	Haiti	Navassa Island--USA	1477
Australia--Christmas Island	Indonesia	1083	Heard Island and McDonald Islands--AUS	Kerguelen--FRA	1479
Australia--Coral Sea Islands	Solomon Islands	1084	Honduras	Jamaica	1480
Austria	Czechia	1085	Honduras	Mexico	1481
Austria	Germany	1086	Honduras	Nicaragua	1482
Austria	Hungary	1087	Honduras	Nicaragua	1483
Austria	Italy	1088	Howland Island--USA	Kiribati	1484
Austria	Liechtenstein	1089	Hungary	Romania	1485
Austria	Slovakia	1090	Hungary	Serbia	1486
Austria	Slovenia	1091	Hungary	Slovakia	1487
Austria	Switzerland	1092	Hungary	Slovenia	1488
Azerbaijan	Georgia	1093	Hungary	Ukraine	1489
Azerbaijan	Iran	1094	Iceland	Norway	1490
Azerbaijan	Iran	1095	Ile Tromelin--FRA	Madagascar	1491

Azerbaijan	Kazakhstan	1096	Ile Tromelin--FRA	Mauritius	1492
Azerbaijan	Russia	1097	Ile Tromelin--FRA	Reunion--FRA	1493
Azerbaijan	Russia	1098	Ile Tromelin--FRA	Seychelles	1494
Azerbaijan	Turkey	1099	India	Indonesia	1495
Azerbaijan	Turkmenistan	1100	India	Maldives	1496
Bahamas	Cuba	1101	India	Myanmar	1497
Bahamas	Haiti	1102	India	Nepal	1498
Bahamas	Turks and Caicos Islands--UK	1103	India	Pakistan	1499
Bahamas	USA	1104	India	Pakistan	1500
Bahrain	Iran	1105	India	Sri Lanka	1501
Bahrain	Qatar	1106	India	Thailand	1502
Bahrain	Saudi Arabia	1107	Indonesia	Timor-Leste	1511
Baker Island--USA	Kiribati	1108	Indonesia	Timor-Leste	1512
Bangladesh	India	1109	Indonesia	Malaysia--Borneo	1504
Bangladesh	India	1110	Indonesia	Malaysia	1503
Bangladesh	Myanmar	1111	Indonesia	Phillipines	1508
Bangladesh	Myanmar	1112	Indonesia	Singapore	1509
Barbados	Martinique--FRA	1114	Indonesia	Thailand	1510
Barbados	Guyana	1113	Indonesia	Vietnam	1513
Barbados	Saint Lucia	1115	Indonesia	Palau	1505
Barbados	Saint Vincent and Grenadines	1116	Indonesia	Papua New Guinea	1506
Barbados	Trinidad and Tobago	1117	Indonesia	Papua New Guinea	1507
Bassas da India--FRA	Europa Island--FRA	1118	Indonesia--Borneo	Malaysia--Borneo	1514
Bassas da India--FRA	Juan de Nova--FRA	1119	Iran	Iraq	1515
Bassas da India--FRA	Madagascar	1120	Iran	Iraq	1516
Bassas da India--FRA	Mozambique	1121	Iran	Kuwait	1517
Belarus	Latvia	1122	Iran	Oman	1518
Belarus	Lithuania	1123	Iran	Pakistan	1519
Belarus	Lithuania	1124	Iran	Pakistan	1520
Belarus	Poland	1125	Iran	Qatar	1521
Belarus	Poland	1126	Iran	Saudi Arabia	1522
Belarus	Russia	1127	Iran	Turkey	1523
Belarus	Ukraine	1128	Iran	Turkmenistan	1524
Belgium	France	1129	Iran	Turkmenistan	1525
Belgium	France	1130	Iran	United Arab Emirates	1526
Belgium	Germany	1131	Iraq	Jordan	1527
Belgium	Luxembourg	1132	Iraq	Kuwait	1528
Belgium	Netherlands	1133	Iraq	Kuwait	1529
Belgium	Netherlands	1134	Iraq	Saudi Arabia	1530

Belgium	United Kingdom	1135	Iraq	Syria	1531
Belize	Guatemala	1136	Iraq	Turkey	1532
Belize	Guatemala	1137	Ireland	United Kingdom	1535
Belize	Honduras	1138	Ireland	United Kingdom--Isle of Mann	1536
Belize	Mexico	1139	Ireland	Northen Ireland--UK	1533
Belize	Mexico	1140	Ireland	Northen Ireland--UK	1534
Benin	Burkina Faso	1141	Israel	Egypt	1537
Benin	Niger	1142	Israel	Jordan	1538
Benin	Nigeria	1143	Israel	Jordan	1539
Benin	Nigeria	1144	Israel	Lebanon	1540
Benin	Togo	1145	Israel	Lebanon	1541
Benin	Togo	1146	Israel	Palestine	1542
Bhutan	China	1147	Israel	Palestine	1543
Bhutan	India	1148	Israel	Syria	1544
Bolivia	Brazil	1149	Italy	Libya	1545
Bolivia	Chile	1150	Italy	Tunisia	1553
Bolivia	Paraguay	1151	Italy	Malta	1546
Bolivia	Peru	1152	Italy	Montenegro	1547
Bonaire--NDL	Venezuela	1153	Italy	San Marino	1548
Bosnia and Herzegovina	Croatia	1154	Italy	Slovenia	1549
Bosnia and Herzegovina	Croatia	1155	Italy	Slovenia	1550
Bosnia and Herzegovina	Montenegro	1156	Italy	Spain	1551
Bosnia and Herzegovina	Serbia	1157	Italy	Switzerland	1552
Botswana	Namibia	1158	Italy	Vatican	1554
Botswana	South Africa	1159	Italy	Vatican City	1555
Botswana	Zambia	1160	Jamaica	Nicaragua	1557
Botswana	Zimbabwe	1161	Jamaica	Navassa Island--USA	1556
Brazil	Colombia	1162	Japan	Phillipines	1559
Brazil	French Guiana--FRA	1163	Japan	Russia	1560
Brazil	French Guiana--FRA	1164	Japan	South Korea	1561
Brazil	Guyana	1165	Japan	Taiwan	1562
Brazil	Paraguay	1166	Japan	Northern Mariana Islands--USA	1558
Brazil	Peru	1167	Jarvis Island--USA	Kiribati	1563
Brazil	Suriname	1168	Jordan	Palestine	1564
Brazil	Uruguay	1169	Jordan	Saudi Arabia	1565
Brazil	Uruguay	1170	Jordan	Saudi Arabia	1566
Brazil	Venezuela	1171	Jordan	Syria	1567

British Virgin Islands--UK	Puerto Rico--USA	1173	Juan de Nova--FRA	Madagascar	1568
British Virgin Islands--UK	American Virgin Islands--USA	1172	Juan de Nova--FRA	Mozambique	1569
Brunei	China	1174	Kaliningrad Oblast--RUS	Lithuania	1570
Brunei	Malaysia	1175	Kaliningrad Oblast--RUS	Lithuania	1571
Brunei	Malaysia	1176	Kaliningrad Oblast--RUS	Poland	1572
Brunei	Phillipines	1177	Kaliningrad Oblast--RUS	Sweden	1574
Brunei	Taiwan	1178	Kaliningrad Oblast--RUS	Poland	1573
Brunei	Vietnam	1179	Kazakhstan	Kyrgyzstan	1575
Bulgaria	Greece	1180	Kazakhstan	Russia	1576
Bulgaria	North Macedonia	1181	Kazakhstan	Russia	1577
Bulgaria	Romania	1182	Kazakhstan	Turkmenistan	1578
Bulgaria	Romania	1183	Kazakhstan	Turkmenistan	1579
Bulgaria	Serbia	1184	Kazakhstan	Uzbekistan	1580
Bulgaria	Turkey	1186	Kenya	Somalia	1581
Bulgaria	Turkey	1187	Kenya	Somalia	1582
Bulgaria	Serbia	1185	Kenya	South Sudan	1583
Burkina Faso	Cote D'Ivoire	1188	Kenya	Tanzania	1584
Burkina Faso	Ghana	1189	Kenya	Tanzania	1585
Burkina Faso	Mali	1190	Kenya	Uganda	1586
Burkina Faso	Niger	1191	Kingman Reef--USA	Kiribati	1587
Burkina Faso	Togo	1192	Kiribati	Marshall Islands	1588
Burundi	DR Congo	1193	Kiribati	Nauru	1589
Burundi	Rwanda	1194	Kiribati	Tokelau--NZ	1591
Burundi	Tanzania	1195	Kiribati	Tuvalu	1592
Cabo Verde	Mauritania	1197	Kiribati	Palmyra Atoll--USA	1590
Cabo Verde	Senegal	1198	Kosovo	North Macedonia	1594
Cabo Verde	Gambia	1196	Kosovo	Montenegro	1593
Cambodia	Laos	1199	Kosovo	Serbia	1595
Cambodia	Thailand	1200	Kuwait	Saudi Arabia	1596
Cambodia	Thailand	1201	Kuwait	Saudi Arabia	1597
Cambodia	Vietnam	1202	Kyrgyzstan	Tajikistan	1598
Cambodia	Vietnam	1203	Kyrgyzstan	Uzbekistan	1599
Cameroon	Central African Republic	1204	Laos	Myanmar	1600
Cameroon	Chad	1205	Laos	Thailand	1601
Cameroon	Equatorial Guinea	1207	Laos	Vietnam	1602
Cameroon	Equatorial Guinea	1208	Latvia	Lithuania	1603
Cameroon	Gabon	1209	Latvia	Lithuania	1604

Cameroon	Nigeria	1210	Latvia	Sweden	1606
Cameroon	Nigeria	1211	Latvia	Russia	1605
Cameroon	Congo	1206	Lebanon	Syria	1607
Canada	Greenland--DNK	1212	Lebanon	Syria	1608
Canada	Saint-Pierre et Miquelon--FRA	1213	Lesotho	South Africa	1609
Canada	United States of America	1214	Liberia	Sierra-Leone	1610
Canada	United States of America	1215	Liberia	Sierra-Leone	1611
Canary Islands--ESP	Western Sahara	1216	Libya	Niger	1613
Cayman Islands--UK	Cuba	1217	Libya	Sudan	1614
Cayman Islands--UK	Honduras	1218	Libya	Tunisia	1615
Cayman Islands--UK	Jamaica	1219	Libya	Tunisia	1616
Central African Republic	Chad	1220	Libya	Malta	1612
Central African Republic	DR Congo	1222	Liechtenstein	Switzerland	1617
Central African Republic	Congo	1221	Lithuania	Poland	1618
Central African Republic	South Sudan	1223	Lithuania	Sweden	1619
Central African Republic	Sudan	1224	Macquarie Island--AUS	New Zealand	1620
Chad	Libya	1225	Madagascar	Reunion--FRA	1622
Chad	Niger	1226	Madagascar	Mozambique	1621
Chad	Nigeria	1227	Madagascar	Seychelles	1623
Chad	Sudan	1228	Malawi	Mozambique	1624
Chagos Islands--UK	Maldives	1229	Malawi	Tanzania	1625
Chile	Peru	1230	Malawi	Zambia	1626
Chile	Peru	1231	Malaysia	Phillipines	1627
China	India	1232	Malaysia	Singapore	1628
China	Japan	1233	Malaysia	Taiwan	1629
China	Kazakhstan	1234	Malaysia	Thailand	1630
China	Kyrgyzstan	1235	Malaysia	Thailand	1631
China	Laos	1236	Malaysia	Vietnam	1632
China	Malaysia	1237	Maldives	Sri Lanka	1633
China	Mongolia	1238	Mali	Mauritania	1634
China	Myanmar	1239	Mali	Niger	1635
China	Nepal	1240	Mali	Senegal	1636
China	North Korea	1241	Malta	Tunisia	1637
China	North Korea	1242	Marshall Islands	Nauru	1638
China	Pakistan	1243	Marshall Islands	Wake Island--USA	1639
China	Phillipines	1244	Martinique--FRA	Venezuela	1641
China	Russia	1245	Martinique--FRA	Saint Lucia	1640
China	South Korea	1246	Mauritania	Morocco	1642

China	Taiwan	1247	Mauritania	Senegal	1643
China	Tajikistan	1248	Mauritania	Senegal	1644
China	Vietnam	1249	Mauritania	Western Sahara	1645
China	Vietnam	1250	Mauritania	Western Sahara	1646
Colombia	Costa Rica	1251	Mauritius	Reunion--FRA	1647
Colombia	Dominican Republic	1252	Mauritius	Seychelles	1648
Colombia	Ecuador	1253	Mayotte--FRA	Seychelles	1649
Colombia	Haiti	1254	Mexico	USA	1650
Colombia	Honduras	1255	Mexico	USA	1651
Colombia	Jamaica	1256	Moldova	Romania	1652
Colombia	Nicaragua	1257	Moldova	Romania	1653
Colombia	Panama	1258	Moldova	Transnistria	1654
Colombia	Panama	1259	Moldova	Ukraine	1655
Colombia	Peru	1260	Mongolia	Russia	1656
Colombia	Venezuela	1261	Montenegro	Serbia	1657
Colombia	Venezuela	1262	Montserrat--UK	Saint Kitts and Nevis	1658
Colombia	Ecuador	1263	Montserrat--UK	Venezuela	1659
Comoros	Mayotte--FRA	1265	Morocco	Spain--Ceuta	1663
Comoros	Madagascar	1264	Morocco	Western Sahara	1664
Comoros	Mozambique	1266	Morocco	Western Sahara	1665
Comoros	Seychelles	1268	Morocco	Portugal	1660
Comoros	Tanzania	1269	Morocco	Spain--Ceuta	1662
Comoros	Reunion--FRA	1267	Morocco	Spain	1661
Congo	DR Congo	1270	Mozambique	South Africa	1666
Congo	DR Congo	1271	Mozambique	South Africa	1667
Congo	Gabon	1272	Mozambique	Tanzania	1668
Congo	Gabon	1273	Mozambique	Tanzania	1669
Cook Islands--NZ	French Polynesia--FRA	1274	Mozambique	Zambia	1670
Cook Islands--NZ	Kiribati	1275	Mozambique	Zimbabwe	1671
Cook Islands--NZ	Tokelau--NZ	1277	Myanmar	Thailand	1672
Cook Islands--NZ	Niue--NZ	1276	Myanmar	Thailand	1673
Costa Rica	Ecuador	1278	Namibia	South Africa	1674
Costa Rica	Nicaragua	1279	Namibia	South Africa	1675
Costa Rica	Nicaragua	1280	Namibia	Zambia	1676
Costa Rica	Panama	1281	Netherlands	United Kingdom	1677
Costa Rica	Panama	1282	New Caledonia--FRA	Norfolk Island--AUS	1678
Cote d'Ivoire	Ghana	1283	New Caledonia--FRA	Solomon Islands	1679
Cote d'Ivoire	Ghana	1284	New Caledonia--FRA	Vanuatu	1680
Cote d'Ivoire	Guinea	1285	New Zealand	Norfolk Island--AUS	1681

Cote d'Ivoire	Liberia	1286	Nicaragua	Panama	1682
Cote d'Ivoire	Liberia	1287	Niger	Nigeria	1683
Cote d'Ivoire	Mali	1288	Nigeria	Sao Tome and Principe	1684
Croatia	Hungary	1289	Niue--NZ	Tonga	1685
Croatia	Italy	1290	North Korea	Russia	1686
Croatia	Montenegro	1291	North Korea	Russia	1687
Croatia	Serbia	1293	North Korea	South Korea	1688
Croatia	Slovenia	1294	North Korea	South Korea	1689
Croatia	Slovenia	1295	North Macedonia	Serbia	1690
Croatia	Montenegro	1292	Northern Cyprus	Syria	1691
Cuba	United States of America--Guantanamo	1301	Northern Cyprus	Turkey	1692
Cuba	Haiti	1296	Norway	Russia	1693
Cuba	Honduras	1297	Norway	Russia	1694
Cuba	Jamaica	1298	Norway	Sweden	1695
Cuba	Mexico	1299	Norway	Sweden	1696
Cuba	United States of America--Guantanamo	1300	Norway	United Kingdom	1697
Cuba	USA	1302	Oman	Pakistan	1698
Curacao--NDL	Venezuela	1303	Oman	Saudi Arabia	1699
Cyprus	Egypt	1306	Oman	United Arab Emirates	1700
Cyprus	Greece	1307	Oman	United Arab Emirates	1701
Cyprus	Israel	1308	Oman	Yemen	1702
Cyprus	Lebanon	1309	Oman	Yemen	1703
Cyprus	Syria	1310	Palau	Phillipines	1704
Cyprus	Turkey	1311	Papua New Guinea	Solomon Islands	1705
Cyprus	Dhekelia--UK	1304	Phillipines	Taiwan	1706
Cyprus	Dhekelia--UK	1305	Phillipines	Vietnam	1707
Czechia	Germany	1312	Poland	Russia	1708
Czechia	Poland	1313	Poland	Russia	1709
Czechia	Slovakia	1314	Poland	Slovakia	1710
Democratic Republic of Congo	Rwanda	1315	Poland	Sweden	1711
Democratic Republic of Congo	South Sudan	1316	Poland	Ukraine	1712
Democratic Republic of Congo	Tanzania	1317	Portugal	Spain	1713
Democratic Republic of Congo	Uganda	1318	Portugal	Spain	1714
Democratic Republic of Congo	Zambia	1319	Puerto Rico--USA	Venezuela	1715
Denmark	Germany	1320	Qatar	Saudi Arabia	1716
Denmark	Germany	1321	Qatar	Saudi Arabia	1717
Denmark	Norway	1322	Qatar	United Arab Emirates	1718

Denmark	Poland	1323	Romania	Russia	1719
Denmark	Sweden--Øresund Bridge	1325	Romania	Serbia	1720
Denmark	Sweden	1324	Romania	Ukraine	1721
Denmark	United Kingdom	1326	Romania	Ukraine	1722
Denmark--Bornholm	Poland	1327	Russia	USA	1727
Djibouti	Eritrea	1329	Russia	Svalbard--NOR	1724
Djibouti	Eritrea	1330	Russia	South Ossetia	1723
Djibouti	Ehtioopia	1328	Russia	Ukraine	1725
Djibouti	Somalia	1331	Russia	Ukraine	1726
Djibouti	Somalia	1332	Russia	Sweden	1729
Djibouti	Somaliland	1333	Russia	Turkey	1730
Djibouti	Yemen	1334	Russia	South Korea	1728
Dominica	Guadeloupe--FRA	1335	Rwanda	Tanzania	1731
Dominica	Venezuela	1337	Rwanda	Uganda	1732
Dominica	Martinique--FRA	1336	Saint Barthelemy--FRA	Saba--NDL	1733
Dominican Republic	Haiti	1338	Saint Barthelemy--FRA	Saint Martin--FRA	1735
Dominican Republic	Haiti	1339	Saint Barthelemy--FRA	Sint Maarten--NDL	1737
Dominican Republic	Turks and Caicos Islands--UK	1341	Saint Barthelemy--FRA	Sint Eustatius--NDL	1736
Dominican Republic	Puerto Rico--USA	1340	Saint Barthelemy--FRA	Saint Kitts and Nevis	1734
Dominican Republic	Venezuela	1342	Saint Eustatius--NDL	Saint Kitts and Nevis	1738
Ecuador	Peru	1343	Saint Kitts and Nevis	Venezuela	1739
Ecuador	Peru	1344	Saint Lucia	Saint Vincent and Grenadines	1740
Egypt	Libya	1348	Saint Lucia	Venezuela	1741
Egypt	Libya	1349	Saint Martin--FRA	Sint Maarten--NDL	1742
Egypt	Sudan	1353	Saint Martin--FRA	Sint Maarten--NDL	1743
Egypt	Sudan	1354	Saint Vincent and Grenadines	Trinidad and Tobago	1744
Egypt	Greece	1345	Saint Vincent and Grenadines	Venezuela	1745
Egypt	Israel	1346	Samoa	Wallis and Futuna--FRA	1748
Egypt	Jordan	1347	Samoa	Tokelau--NZ	1746
Egypt	Palestine	1351	Samoa	Tonga	1747
Egypt	Saudia Arabia	1352	Saudi Arabia	Sudan	1749
Egypt	Palestine	1350	Saudi Arabia	United Arab Emirates	1750
El Salvador	Guatemala	1355	Saudi Arabia	United Arab Emirates	1751
El Salvador	Guatemala	1356	Saudi Arabia	Yemen	1752
El Salvador	Honduras	1357	Saudi Arabia	Yemen	1753
El Salvador	Honduras	1358	Seychelles	Tanzania	1754
El Salvador	Nicaragua	1359	Slovakia	Ukraine	1755
Equatorial Guinea	Gabon	1360	Slovakia	Ukraine	1756

Equatorial Guinea	Gabon	1361	Solomon Islands	Vanuatu	1757
Equatorial Guinea	Nigeria	1362	Somalia	Somaliland	1758
Equatorial Guinea	Sao Tome and Principe	1363	Somalia	Yemen	1759
Eritrea	Ethiopia	1364	Somaliland	Yemen	1760
Eritrea	Sudan	1366	South Africa	Zimbabwe	1761
Eritrea	Sudan	1367	South Sudan	Uganda	1762
Eritrea	Saudia Arabia	1365	Sudan	South Sudan	1763
Eritrea	Yemen	1368	Syria	Turkey	1764
Estonia	Finland	1369	Syria	Turkey	1765
Estonia	Finland	1370	Taiwan	Vietnam	1766
Estonia	Latvia	1371	Tajikistan	Uzbekistan	1767
Estonia	Latvia	1372	Tanzania	Uganda	1768
Estonia	Russia	1373	Tanzania	Zambia	1769
Estonia	Russia	1374	Thailand	Vietnam	1770
Estonia	Sweden	1375	Tokelau--NZ	Wallis and Futuna-- FRA	1771
Eswatini	Mozambique	1376	Tonga	Wallis and Futuna-- FRA	1772
Eswatini	South Africa	1377	Transnistria	Ukraine	1773
Ethiopia	Kenya	1378	Trinidad and Tobago	Venezuela	1774
Ethiopia	Somalia	1379	Turkey	Ukraine	1775
Ethiopia	South Sudan	1380	Turkmenistan	Uzbekistan	1776
Ethiopia	Sudan	1381	Tuvalu	Wallis and Futuna-- FRA	1777
Europa Island--FR	Madagascar	1382	Zambia	Zimbabwe	1778
Europa Island--FR	Mozambique	1383	Cyprus	North Cyprus	1779
Faroe Islands--DNK	Iceland	1384	Cyprus	North Cyprus	1780
Faroe Islands--DNK	Norway	1385	Dhekelia--UK	North Cyprus	1781
Faroe Islands--DNK	United Kingdom	1386	Dhekelia--UK	North Cyprus	1782
Federated States of Micronesia	Marshall Islands	1388	Colombia	Ecuador	1783
Federated States of Micronesia	Palau	1389			
Federated States of Micronesia	Papua New Guinea	1390			
Federated States of Micronesia	Guam--USA	1387			
Fiji	New Caledonia--FRA	1391			
Fiji	Wallis and Futuna--FRA	1395			
Fiji	Solomon Islands	1392			
Fiji	Tonga	1393			
Fiji	Tuvalu	1394			

6.2.1. Dyads included in the JMN Dataset.

Country 1	Country 2	Dyad ID	Country 1	Country 2	Dyad ID
Akrotiri--UK	Cyprus	1012	France	Monaco	1409
Akrotiri--UK	Cyprus	1013	France	Spain	1410
Albania	Greece	1014	France	Spain	1411
Albania	Greece	1015	France	Switzerland	1412
Albania	Italy	1016	France	United Kingdom	1413
Algeria	Spain	1028	France	United Kingdom	1414
Andorra	France	1041	France	Guernsey--UK	1403
Andorra	Spain	1042	France	Jersey--UK	1406
Anguilla--UK	Saint Martin--FRA	1055	French Guiana--FRA	Suriname	1415
Antigua and Barbuda	Guadeloupe--FRA	1056	French Guiana--FRA	Suriname	1416
Austria	Czechia	1085	Germany	Luxembourg	1427
Austria	Germany	1086	Germany	Netherlands	1428
Austria	Hungary	1087	Germany	Netherlands	1429
Austria	Italy	1088	Germany	Poland	1430
Austria	Liechtenstein	1089	Germany	Poland	1431
Austria	Slovakia	1090	Germany	Sweden	1432
Austria	Slovenia	1091	Germany	Switzerland	1433
Austria	Switzerland	1092	Germany	United Kingdom	1434
Barbados	Martinique--FRA	1114	Gibraltar--UK	Spain	1438
Belarus	Lithuania	1124	Gibraltar--UK	Spain	1439
Belarus	Poland	1126	Greece	Italy	1443
Belgium	France	1129	Greece	North Macedonia	1445
Belgium	France	1130	Greece	Turkey	1446
Belgium	Germany	1131	Greece	Turkey	1447
Belgium	Luxembourg	1132	Guadeloupe--FRA	Montserrat--UK	1454
Belgium	Netherlands	1133	Guadeloupe--FRA	Venezuela	1455
Belgium	Netherlands	1134	Hungary	Romania	1485
Belgium	United Kingdom	1135	Hungary	Serbia	1486
Bosnia and Herzegovina	Croatia	1154	Hungary	Slovakia	1487
Bosnia and Herzegovina	Croatia	1155	Hungary	Slovenia	1488
Brazil	French Guiana--FRA	1163	Hungary	Ukraine	1489
Brazil	French Guiana--FRA	1164	Ile Tromelin--FRA	Reunion--FRA	1493
Bulgaria	Greece	1180	Ireland	United Kingdom	1535
Bulgaria	Romania	1182	Ireland	United Kingdom--Isle of Mann	1536
Bulgaria	Romania	1183	Italy	Tunisia	1553

Bulgaria	Turkey	1186	Italy	Malta	1546
Bulgaria	Turkey	1187	Italy	Montenegro	1547
Bulgaria	Serbia	1185	Italy	San Marino	1548
Canary Islands--ESP	Western Sahara	1216	Italy	Slovenia	1549
Comoros	Mayotte--FRA	1265	Italy	Slovenia	1550
Comoros	Reunion--FRA	1267	Italy	Spain	1551
Croatia	Hungary	1289	Italy	Switzerland	1552
Croatia	Italy	1290	Italy	Vatican	1554
Croatia	Montenegro	1291	Kaliningrad Oblast--RUS	Lithuania	1570
Croatia	Serbia	1293	Kaliningrad Oblast--RUS	Lithuania	1571
Croatia	Slovenia	1294	Kaliningrad Oblast--RUS	Poland	1572
Croatia	Slovenia	1295	Kaliningrad Oblast--RUS	Poland	1573
Croatia	Montenegro	1292	Latvia	Lithuania	1603
Curacao--NDL	Venezuela	1303	Latvia	Lithuania	1604
Cyprus	Egypt	1306	Latvia	Sweden	1606
Cyprus	Greece	1307	Latvia	Russia	1605
Cyprus	Israel	1308	Libya	Malta	1612
Cyprus	Lebanon	1309	Lithuania	Poland	1618
Cyprus	Syria	1310	Lithuania	Sweden	1619
Czechia	Germany	1312	Madagascar	Reunion--FRA	1622
Czechia	Poland	1313	Martinique--FRA	Venezuela	1641
Czechia	Slovakia	1314	Martinique--FRA	Saint Lucia	1640
Denmark	Germany	1320	Mauritius	Reunion--FRA	1647
Denmark	Germany	1321	Mayotte--FRA	Seychelles	1649
Denmark	Poland	1323	Moldova	Romania	1653
Denmark	Sweden--Øresund Bridge	1325	Morocco	Spain--Ceuta	1663
Denmark	Sweden	1324	Morocco	Spain--Ceuta	1662
Denmark	United Kingdom	1326	Morocco	Spain	1661
Denmark--Bornholm	Poland	1327	Netherlands	United Kingdom	1677
Dominica	Guadeloupe--FRA	1335	Norway	Sweden	1695
Dominica	Martinique--FRA	1336	Norway	Sweden	1696
Egypt	Greece	1345	Poland	Russia	1708
Estonia	Finland	1369	Poland	Russia	1709
Estonia	Finland	1370	Poland	Slovakia	1710
Estonia	Latvia	1371	Poland	Sweden	1711
Estonia	Latvia	1372	Poland	Ukraine	1712

Estonia	Russia	1373	Portugal	Spain	1713
Estonia	Russia	1374	Portugal	Spain	1714
Estonia	Sweden	1375	Romania	Serbia	1720
Finland	Norway	1396	Romania	Ukraine	1721
Finland	Russia	1397	Romania	Ukraine	1722
Finland	Russia	1398	Saint Barthelemy-- FRA	Saint Martin--FRA	1735
Finland	Sweden	1399	Saint Martin--FRA	Sint Maarten--NDL	1742
Finland	Sweden	1400	Saint Martin--FRA	Sint Maarten--NDL	1743
France	Luxembourg	1407	Slovakia	Ukraine	1755
France	Monaco	1408			

6.3. Sample Codebook Entry.

Concept: Describe the purpose/concept of the dataset.

Organizing Principle:

- Primary key?
- Foreign key?

Number of indicators | variables: X | X

- Indicator X: describe the concept of the indicator
 - o Variable X: **bolded name of the variable** and what it measures. Variables should be exclusive and exhaustive.
 - Type: *Can be 'String,' 'Boolean,' or 'Numeric.'*
 - Values: *Unlimited/0 and 1/Natural numbers >0; -888, -999*

Design:

- Design: What does the indicator do? How is it being measured and defined?
- Updating schedule: When does data need to be updated? Default is 'whenever changes are made to the dyad/boundary.'

Key Definitions:

- Include definitions/explanations for key terms and concepts in your dataset

Uses and Limits:

- Uses: how can it be used in research? How can it be used with other data in the database?
- Limits: How is it limited? Are there potential issues with the data sources, definitions, scope?

6.4. Guidelines for Data Collection.

Along with our research network partners across the world, our team at the University of Victoria designs data tables and collects data from a variety of sources. Some data is collected from state and public sources and then transformed; our sources are detailed where this is the case. Both these sources, and the sources used for original data collection, are included in the codebook bibliography.

6.4.1 The Dos and Don'ts of Data collection:

- *Don't* use dirty data! Dirty data is data that is inconsistent or poorly structured. Computers are not (yet) intelligent enough to make sense of data contextually the way that human beings can pick out signal from noise.
- *Don't* treat data table tables like regular excel sheets. Be careful to avoid empty or duplicated rows or columns and use the appropriate entries for missing or inapplicable data (do not leave cells blank).
- *Don't* let pre-formatting stand: even seemingly benign extra spaces, nonprinting characters, mark-up tags, and so on, can cause headaches.
- *Do* be precise and consistent in your data entry.
- *Do* treat Booleans and other-fixed value columns meticulously.
- *Do* use spell-check and standardize your text cases.

6.5. Guidelines for using SQL.

Structured Query Language or SQL (pronounced as one word or letters), as the name suggests, is a logical language used extensively to manage a relational database management system (RDBMS). SQL is used to create the database, to structure tables, to perform basic data management, and to perform complex queries.

SQL is the medium through which we execute commands in a relational database. Since its logic follows that of 'natural language', i.e., languages like English, we can think of what we want from the database in the form of a statement and then almost translate it phrase by phrase into SQL. Then the database responds to us by either returning results in the form of rows retrieved from its tables or telling us that there are no records, in other words, no rows fulfilling our query conditions. (Needless to say, if a SQL statement is syntactically defective, an error message is shown, which is also a response in the sense that the database administrator knows they have to fix the way their query is formulated.)

6.5.1. Formulating Queries.

Queries in SQL are simple to formulate, given that SQL follows the logic of natural language. For example, say we want to find all the dyads in the database that are: (1) disputed; (2) located in Asia; (3) not crossed by a desert; and (4) established in the first half of the 20th century. Further, say that we want to list the total number of these dyads by the year in which their current shape was established in ascending order. These five conditions could be written out as the query you see below.

```

SELECT `H1_date_establishment_basic`, COUNT(`DyadID`) AS `No of Dyads Formed`
FROM `Dyads`
WHERE `Se1_border_disputed` = 1
AND `UNG_region` BETWEEN 3100 AND 3599
AND `F2_desert` != 1
AND `H1_date_establishment_basic` > 1900
AND `H1_date_establishment_basic` <= 1950
GROUP BY `H1_date_establishment_basic`
ORDER BY `H1_date_establishment_basic` ASC;

```

In this sample, we have lines identified with numbers with lines 4 to 8 specifying those five conditions:

- Line 3 shows we want borders that are disputed with the Boolean for Se1 variable marked 1 or ‘true’.
- Line 4 says that the selected dyads must be within the two mentioned numerical identifiers, which mark the limits of all Asian dyads in our database.
- Line 5 states, in another binary choice, that the F2 variable for deserts must not equal 1—one might ask why we did not simply say it must equal 0 (or ‘false’), and that is because we do not want to rule out values such as -999 which is used for maritime dyads in this case (for more info on this value and what it means, see 2.3. Missing and Inapplicable Data, and Cut-off Dates).
- Lines 6 and 7 say the date of establishment of basic for the dyads in question must be greater than the year 1900 and lesser than or equal to the year 1950.

Now let us turn to the remaining lines: the first three lines mean we want to select two fields—i.e., H1 variable and DyadID—from the ‘Dyads’ table in our database. On line 1, we also want to count the number of DyadIDs that meet the specified criteria as ‘summary rows’ showing their total; further, we want to give a new column name (which is “No of Dyads Formed”) to these summary rows for convenience.

The last two lines mean, respectively, that the total number of dyads (as counted in line 1) must be grouped round each year in our result set and those years must be listed in ascending order. (The ORDER BY clause lists the result set in ascending order by default, which makes the use of the ASC keyword optional.) Even though this query has to fulfil several conditions, it is still quite simple and straightforward since it is executed on one table only; more complex queries join several tables and are executed across many more dimensions, which is one of the features of a fully-fledged relational database as opposed to a spreadsheet with basic functions.

6.5.2. Database Platform.

A relational database management system (RDBMS) is a software acting as an interface between the database and its administrators who can manage and query it. MySQL, the platform that BIG Dyads uses, is known as the “most popular Open Source SQL relational database management system.” In other words, MySQL not only utilises SQL to query data

but also “it is possible for anyone to use and modify the software” itself. Apart from popularity (which means there is a greater community who use and can troubleshoot it) and being Open Source, criteria such as scalability and query-response performance were considered, for all of which MySQL scores very high. Last but not least, this platform was fully supported by the University of Victoria Infrastructure Services, which made opting for MySQL as the RDBMS of choice for BIG Dyads all the easier.

6.5.2.1. Spreadsheet Presentation.

Any presentation of BiG Dyads data tables in the form of spreadsheets (such as Microsoft Excel) are, by necessity, unnormalised, i.e. they are not in First Normal Form (1NF).

6.5.3. Normal Forms.

Database normalisation entails “creating tables and establishing relationships between those tables according to rules designed both to protect the data and to make the database more flexible by eliminating redundancy and inconsistent dependency.”⁴ There are several levels of normalisation, aka Normal Forms, each of which builds upon the previous level. E.g., if the first set of rules is observed, the database is said to be in ‘first normal form’, with the second rule, it’ll be in ‘second normal form’, and so on.

For our purposes here, which is first and foremost about gathering clean data, first Normal Form is the most important, at least for a start. NF1 rules, which needs to be borne in mind whilst collecting data, are as follows:

- Each table cell should contain a single value.
- Data in each column should be of the same type.
- Each record (i.e., the entirety of a row which consists of all the individual cells under their respective columns) needs to be unique.
- And, finally, the order of the columns should not matter; in other words, if you re-order columns, no information is lost, no error resulted.

We can also require ourselves to follow further, tailored rules in addition to NF1, because we want to make the database more tightly structured, efficient, and query friendly. Some of these rules are:

- When designing variables, try to keep numeric and textual variables separate (i.e., under different columns).
- Also, turn fixed-value variables into binary, tertiary, etc., variables.
- Establish a master list of keywords for the phenomena you study (e.g., geographical names) which is standard PLUS always updated everywhere.
- Stick with a controlled vocabulary, especially for textual (i.e., string) variables that are utilised consistently throughout the database.

6.5.4. Banned Characters.

To preclude problems at the point of data insertion into the database or subsequent querying, adhere to using the characters 0–9 and a–z, A–Z as much as possible. Should you

need to use non-Latin alphabets or other rare characters, consult with the database manager first.

The following characters must be avoided from being inserted into data table spreadsheets:

? ! # \$ % & " ' () [] { } * | + , - . / : ; < = > @ ^ ` ~

Instead, try to rewrite string values to avoid commas, to clean up extra spaces, and to avoid dashes at the beginning of values. In addition, insert dates with dashes instead of backslashes.