'Dangerous Dyads' and an Introduction to Applied Research

POSC 3610 – International Conflict

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Goal for Today

Introduce the concept of "dangerous dyads" that shape how we study peace science and get you all reading regression tables.

Let's Jump Into It

Most stuff we'll discuss this semester will include lengthy treatment of literature and arguments.

- However, we won't be doing any of that today.

Today, we'll get you acclimated with reading regression tables and understanding what is associated with conflict.

- This "dangerous dyads" framework still shapes how researchers explain broad patterns of inter-state conflict.

Research Design: Unit of Analysis

Dyad-years are the most common units of analysis in this line of peace science.

- *Dyad*: a pairing of any two states (e.g. USA-Canada, India-Pakistan, Cameroon-New Zealand).
- *Year:* This should be intuitive...

Most of what we'll be doing is *non-directed* dyads.

- *Non-directed*: USA-Canada and Canada-USA are the same. Useful for explaining simple onsets.
- *Directed*: USA-Canada and Canada-USA are different observations. Useful for explaining initiating/targeting.

Here's what this looks like in table form.

Table 1: A Simple Table of Ten Dyad Years for the U.S. and Canada

country1	country2	year
USA	Canada	1920
USA	Canada	1921
USA	Canada	1922
USA	Canada	1923
USA	Canada	1924
USA	Canada	1925
USA	Canada	1926
USA	Canada	1927
USA	Canada	1928
USA	Canada	1929

Research Design: Dependent Variable

MID onsets are some of the most common dependent variables in this line of peace science.

- *Dependent variable*: an outcome we want to explain.
- *MID onset*: the initiation of at least one threat, display, or use of force from one dyad member to another.
  - We'll discuss MIDs in greater detail soon, esp. how countries can start new MIDs with other MIDs ongoing.

Here's what this looks like in table form.

Table 2: A Simple Table of 11 Dyad Years for India and Pakistan [Data: GML-MID (v. 2.03)]

country1	country2	year	midonset	midongoing
India	Pakistan	2000	0	1
India	Pakistan	2001	1	1
India	Pakistan	2002	0	1
India	Pakistan	2003	0	1
India	Pakistan	2004	1	1
India	Pakistan	2005	1	1
India	Pakistan	2006	0	0
India	Pakistan	2007	0	0
India	Pakistan	2008	1	1
India	Pakistan	2009	0	1
India	Pakistan	2010	0	1

Research Design: Independent Variables

We'll focus on seven of Bremer's "factors" for his dangerous dyads.

1. Contiguity
2. Joint democracy
3. Power preponderance
4. Major powers
5. Joint alliance
6. Advanced economies
7. Militarization

We'll talk about how we operationalize these.

Contiguity

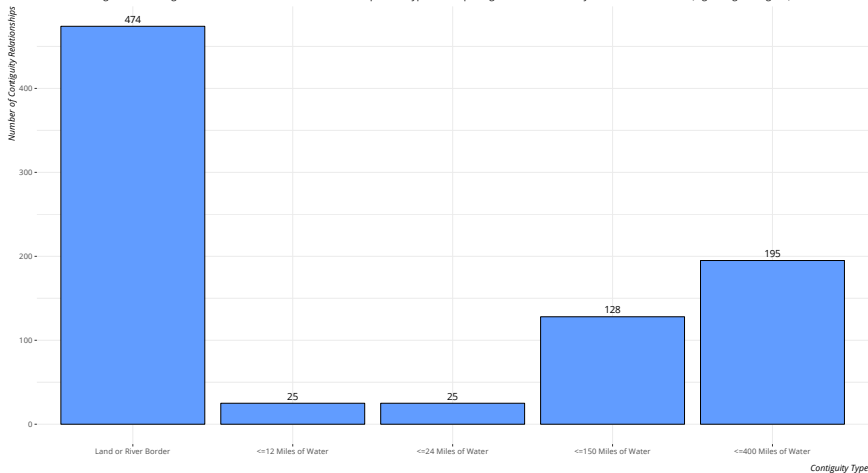Contiguity is routinely the most robust predictor of MID onset.

- We'll talk about "opportunity", "interactions", and "territory" in a later lecture.

For now, the intuition is states closer to each other are more likely to have a MID.

- The contiguity variable assumes a 1 if both states in the dyad are land-contiguous (e.g. USA-Canada) or are separated by <=150 miles of water (e.g. UK-Netherlands).

Most Contiguity Relationships are Land or River Borders

It's worth noting we're selecting on states that have one of these relationships. Your typical state pairing in the world isn't anywhere near each other (e.g. Mongolia-Nigeria).

Number of Contiguity Relationships (y-axis)

Contiguity Type	Value
Land or River Border	474
<=12 Miles of Water	25
<=24 Miles of Water	25
<=150 Miles of Water	128
<=400 Miles of Water	195

Contiguity Type

Data: Correlates of War Direct Contiguity Data Master File (v. 3.2)

Joint Democracy

That no two democracies have "ever" fought war against each other is the "closest thing to an empirical law" in all political science.

- Our best data to test this is the Polity data, which measures executive constraints and recruitment.

We'll belabor the reasons why in a few weeks, but for now the intuition is joint democracies have fewer MIDs.

- Conventional cutoff: `polity2` score >= 6 for *both* members of the dyad.
- The joint democracy variable is a 1 if that's true, 0 otherwise.

The Distribution of All polity2 Scores for All Countries (1800–2016)

The distribution is clearly bimodal with two prominent peaks at 10 (maximally democratic) and -7 (stable autocracy)
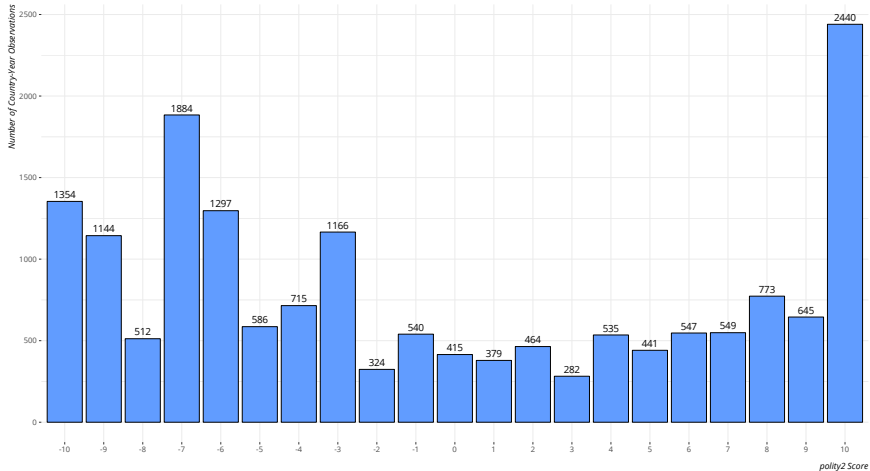
Data: The Polity Project (Center for Systemic Peace)

Power Preponderance

"Power" has a conspicuous place in IR literature. There's a lot we (think we) know about it.

- We'll have a full week on how we tackle the problem of "power" in IR.

For now, we believe power preponderance *decreases* likelihood of MID onset.

- Measurement: variable = 1 if either side in dyad is three times as powerful (CINC scores) than the other side.

Major Powers

Major powers seem disproportionately responsible for our MIDs and wars, especially in the 19th century.

- CoW has a data set on the composition of "major powers" from 1816 to the present.
- We'll code a 1 if there's at least one major power in the dyad.

Table 3: The Major Powers [Data: Correlates of War (v. 2016)]

stateabb	styear	endyear	stateabb	styear	endyear
USA	1898	2016	AUH	1816	1918
UKG	1816	2016	ITA	1860	1943
FRN	1816	1940	RUS	1816	1917
FRN	1945	2016	RUS	1922	2016
GMY	1816	1918	CHN	1950	2016
GMY	1925	1945	JPN	1895	1945
GMY	1991	2016	JPN	1991	2016

Joint Alliance

Alliances occupy a special/contentious place in the peace science literature.

- Their presence coincides with our most prominent wars (e.g. WWI).
- Major debate about whether alliances lead to peace or war.

At the dyadic level, our intuition is allies are unlikely to fight *each other*.

- We'll code a 1 if both states in the dyad have some kind of an alliance (i.e. defense pact, non-aggression, entente, neutrality), 0 otherwise.

"Advanced Economies" and Militarization

Bremer also contends states with advanced economies and those more militarized are important factors. Here's (roughly) how Bremer codes them.

- *Jointly advanced economies*: assumes a 1 if *both* dyad members' share of steel production and energy consumption > share of total population in a given year. Otherwise: 0.
  - We'd ideally use GDP data for this but we lack great GDP data before WWII.
- *Jointly militarized states*: assumes a 1 if *both* dyad members' share of military personnel (part of CINC) > share of total population in a given year. Otherwise: 0.
  - We'll belabor CINC more in the week on "power" but CINC is an index that prominently measures share of military spending/expenditure.

Data come from Correlates of War's National Military Capabilities.

Writing It Out

Going forward, don't be surprised if I lump all this information to a single slide. Like this:

- *Unit of analysis*: dyad-year
- *DV*: MID onset [0,1]
- *IVs*: Contiguity, joint democracy, power preponderance, major power in dyad-year, joint alliance, jointly advanced economies, jointly militarized.

Modeling Notes

Articles you'll read will also mention some kind of methodological notes. These may include:

- "Cubic splines" and "peace years" for "temporal correlation."
  - i.e. you're less likely to have a MID onset if you haven't had one in a while.
- "Clustered" standard errors or "country/dyad fixed effects."
  - i.e. some countries (e.g. the U.S.) or dyads (e.g. India-Pakistan) may be peculiar for which conflict is more/less likely.

Don't get too in the weeds with these things. Just note they're there to make our inferences stronger.

Logistic Regression

Almost every regression you encounter in this class will be a logistic/probit regression.

- i.e. the outcome we want to explain (onset or escalation) is "there" (1) or "not there" (0).

Interpret the model in the context of *positive* or *negative* relationships relative to the "likelihood" of the outcome being present.

- *Negative relationship*: as the independent variable goes up (e.g. joint democracy), the likelihood of a MID goes down.
- *Positive relationship*: as the independent variable goes up (e.g. the dyad is contiguous), the likelihood of a MID goes up.

Our Expectations of the Seven Factors

Factor	Expectation
Contiguous dyad	+
Joint democracy	-
Power preponderance	-
Major power in the dyad	+
Shared alliance	-
Jointly advanced economies	-
Jointly militarized states	+

Positive (+) relationships increase the likelihood of a MID onset while negative (-) relationships decrease the likelihood of a MID onset (as the value of the factor/independent variable increases).

Evaluating a Regression Analysis

I mention there are three things to do when evaluating a regression analysis.

1. Know (however, general) the data used.
2. Know what the objects in the regression table are saying.
3. Know what the regression table *isn't* saying.

Interpreting the Regression Output

Find the following objects in the regression table:

1. The numbers in parentheses
2. The numbers *not* in parentheses
3. The asterisks that appear next to some numbers.

Interpreting the Regression Output

1. The numbers in parentheses

   - These are the **standard errors**.
   - They communicate a prediction error (of sorts).
   - However, their interpretation depends on the associated numbers not in parentheses.

2. The numbers *not* in parentheses

   - These are the **regression coefficients**.
   - They communicate the estimated change in the DV for a unit-change in the IV.
   - Determine if it's positive or negative (recall: relationships).
   - However, their substantive interpretation depends on the presence/absence of asterisks.

3. The asterisks that appear next to some numbers.

   - These communicate the **statistical significance**.
   - i.e. is the estimated positive/negative effect discernible from zero?
   - If so, we say that the IV has a "significant" (i.e. highly unlikely to be zero) effect on the DV.

Table 5: A Simple 'Dangerous Dyads' Model of MID Onset for All Dyad-Years, 1816-2010

	MID Onset in a Dyad-Year
Contiguous Dyad	0.052***
	(0.0004)
Joint Democracy	−0.003***
	(0.0002)
Power Preponderance	−0.002***
	(0.0002)
Major Power in the Dyad	0.013***
	(0.0002)
Shared Alliance	−0.001***
	(0.0003)
Jointly Advanced Economies	−0.003***
	(0.0003)
Jointly Militarized States	0.003***
	(0.0002)
N	779864

***p < .01; **p < .05; *p < .1
Data: GML-MID Data (v. 2.03)

A Simple 'Dangerous Dyads' Model of MID Onset for All Dyad-Years, 1816-2010

Contiguity, the presence of a major power, and jointly advanced economies have the largest absolute effects.

Coefficient Estimate
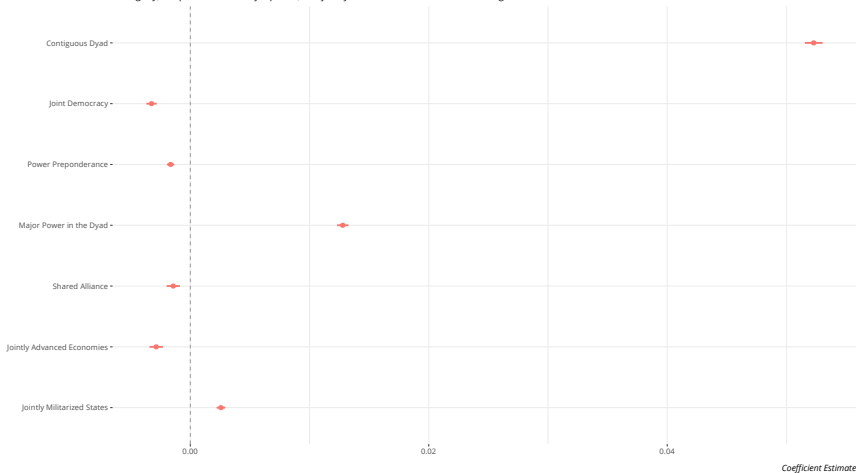
Conflict data: GML-MID (v. 2.03). Democracy: Polity project (v. 2016). All others: Correlates of War.

Conclusion

Bremer's "dangerous dyads" still shape much of what we know of conflict onset.

- Contiguity and major power presence make for greater likelihood of MID onset.

The hope is this lecture at least partially demystified regression tables.

- They'll constitute the bulk of the articles we read, so you should get used to them.

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