Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

Appendix for: Peaceful Neighborhoods and Democratic Differences

Mark David Nieman* Douglas M. Gibler†

Online Appendix

This appendix provides additional information to supplement that of the main manuscript. First, we present estimates for the model used to construct the instrumental variable. Second, we compare the model fit of the *reliability* and *threat-and-reliability* models using the Clarke distribution-free test. Next, we present descriptive data of our latent variable and predicted probabilities from the *relevance* equation in order to provide additional face validity for the measure and model. We then conduct a series of robustness checks, including reduced models and alternative specifications, as well as several models that take steps to account for an earlier selection effect arising from alliance formation and indirect democratic effects. The models presented in the main manuscript are robust to each of these alternative specifications. We also present Stata code for the split-sample logit, and report a table of all alliance violations along with descriptive data on *territorial threat*, *democracy*, and *change in leader's societal coalition*. Finally, we present the results from testing an additional implication of our broader theory, focusing on the role of territorial threat on the effect of democracy and international trade. The results from this analysis are consistent with those from the alliance application.

*Assistant Professor, Department of Political Science, University of Toronto, markdnieman@gmail.com.
†Professor, Institute for Social Science Research, University of Alabama, dmgibler@ua.edu.

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

1 Construction of the Instrumental Variable, *Territorial Threat*

Table A.1 reports estimates for the variables used to construct the instrumental variable, *territorial threat*. Data and model specification are from Gibler and Tir (2014, Table 1). Our model differs from Gibler and Tir (2014), however, in that while they use the period from 1816–1999, we use the period 1919–2001, to match the same temporal domain as our main analysis. Our results are consistent with Gibler and Tir's (2014) findings, with each variable having the same sign and significance level as the original analysis.

Table A.1: Predicting Fatal MIDs in Contiguous Dyads, 1919–2001.

	β	S.E.
Same Colonial Master	0.291*	(0.112)
Peaceful Territorial Transfer in Dyad	-0.575*	(0.193)
Violent Territorial Transfer in Dyad	0.496*	(0.122)
Defense Pact with All Neighbors	-0.909*	(0.216)
Civil War in Either State	0.220*	(0.107)
Highest Militarization Level Among Neighbors	15.879*	(2.191)
Previous Territorial MID Against Either State	0.425*	(0.097)
Border Age (logged)	0.193*	(0.038)
Peace Years	-0.449*	(0.027)
Peace Years (Squared)	0.012*	(0.001)
Peace Years (Cubed)	-0.001*	(0.001)
Constant	-2.831*	(0.144)
Log-likelihood	-1684.437	
Observations	13995	

Note: *p <0.05, two-tailed. Replication of Gibler and Tir (2014, Table 1) for 1919–2001 sample.

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

2 Model Fit

We evaluate whether the inclusion of the *relevance* equation improves model fit and the quality of our estimates. To do this, we compare the fit of model 2—denoted as R, for *reliability* model—and model 3—denoted as $T\&R$, for *threat-and-reliability* model—from Table 1 of the main manuscript, using Clarke's (2003; 2007) distribution-free test for non-nested models. We use the Clarke test, rather than an F-test or likelihood ratio test, because models 2 and 3 are non-nested due to their differing functional forms: model 2 assumes an additive non-linear logit function, while model 3 is a mixture of two logistic distributions (for a discussion on differing types of non-nested models, see Clarke 2001).[1]

Clarke's distribution-free test evaluates whether the median logged ratio of the likelihood for the individual observations of two models are equal. If the first model is closer to the true specification, more than half of the individual logged ratios of the likelihoods will be greater than zero. More formally:

$$H_0 : Pr_0 \left[\ln \frac{f\left(Y_i|X_i;\beta_*\right)}{g\left(Y_i|Z_i;\gamma_*\right)} > 0 \right] = 0.5 \tag{1}$$

where the numerator is estimated model f, which predicts Y_i from a set of covariates, X_i, and estimated parameters, β_*; the denominator is estimated model g, which predicts Y_i from a set of covariates, Z_i, and estimated parameters, γ_*. The null hypothesis is that the median logged ratio of the likelihoods between the two models is equal to 0, i.e. the probability that the median logged ratio of the likelihoods of f is greater than g is 0.5. If d_i is set equal to $\ln f\left(Y_i|X_i;\beta_*\right) - \ln g\left(Y_i|Z_i;\gamma_*\right)$, the test statistic is:

$$B = \sum_{i=1}^{n} I_{(0,+\infty)}\left(d_i\right) \tag{2}$$

where I is a dichotomous indicator equal to 1 if $n_i > 0$ in Equation 1, and 0 if $n_i \leq 0$.

[1]Neither AIC nor BIC are appropriate as they do not include information from the rival theory, nor do they permit probabilistic statements regarding model selection (Clarke 2003).

Table A.2: Comparison of Model Fit using Clarke's Test.

$\sum_{i}^{n}(\text{ll}_{\text{M}_{\text{T\&R}},i} - \text{ll}_{\text{M}_{\text{R}},i} > 0)$	3555
$\sum_{i}^{n}(\text{ll}_{\text{M}_{\text{T\&R}},i} - \text{ll}_{\text{M}_{\text{R}},i} < 0)$	2840
Positive, one-side test (p-value)	$< .001$

Note: Clarke distribution-free test uses binomial distribution ($p = .5$).

Equation 2 is the sum of positive differences and is distributed according to a Binomial distribution with n trials and a mean equal to 0.5. We apply the average Schwarz correction to Clarke's distribution-free test to account for differences in the number of estimated parameters between the two models, adjusting the individual log-likelihoods for model f by a factor $[(p/2n)\ln n]$ and those of model g by a factor $[(q/2n)\ln n]$ (see Clarke 2007, 350).

Table A.2 reports the results of our non-nested model comparisons. We find that the split-population model returns a positive log-likelihood ratio for 3555 of the 6395 observations, which generates a p-value of <0.001. We are thus able to reject the null that the models are equal, instead finding support for the $T\&R$ model.

The results indicate that the *threat-and-reliability* model outperforms the *reliability* model. That is, the split-population logit's ability to probabilistic assign weights to how likely observations are to "opt into" the "at-risk" pool substantially outperforms a (logit) model which assumes all states are equally "at-risk" of violating an alliance.

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

3 Robustness and Validity Checks

This section reports several robustness checks, divided into three parts. First, we provide some basic descriptive statistics and bivariate analyses to offer validity for the latent measures. Second, we report several reduced models to demonstrate that our main results are robust to model specification. Third, we report several models that account for a potential earlier selection effect related to alliance formation. Lastly, we consider whether democracy precedes territorial threat on the causal pathway, with the latter serving as a mediator for the former. The results of these various specifications and models are consistent with those from our main model reported in Table 1 of the manuscript, which demonstrates that alliance violations are more likely as territorial threat increases and regime type is spurious once we account for this environmental factor.

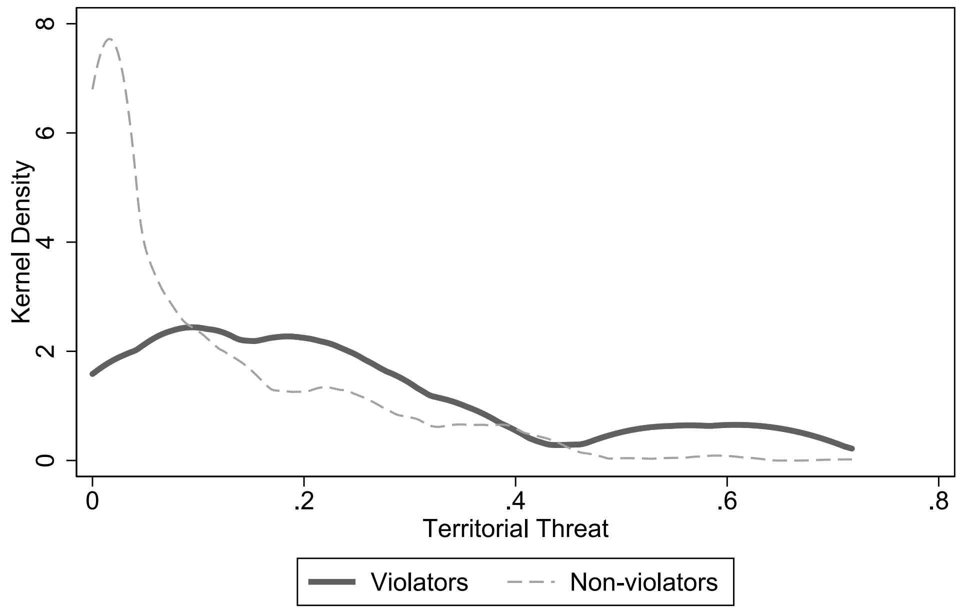
Validity

We begin our robustness checks by visualizing the difference in *territorial threat* between states that violate an alliance and those do not from the sample from used in models 2 and 3 from Table 1 of the main manuscript. The mean territorial threat for alliance violators is 0.218 with a standard deviation of 0.190 and $N = 68$, while the mean for non-violators is 0.108 with a standard deviation of 0.125 and $N = 6327$. A difference of means between the two samples is statistically significant with $p < 0.001$. As Figure A.1 demonstrates, a large swath of states at low levels of territorial threat comprise a large proportion of the non-violators.

Next, we present tables with the highest 15 predicted values based on estimates from the *relevance* equation, as well as for the *territorial threat* measure. Given that our data consist of directed dyads, and states can have multiple alliances in a given year, we report the top 15 state-years, based on predicted scores from the *relevance* equation from model 3 from Table 1 of the main manuscript. The top 15 state-years are displayed in Table A.3.

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

Figure A.1: Kernel Density of Alliance Violators and Non-violators by Territorial Threat.



Note: The mean territorial threat for alliance violators is 0.218 with a standard deviation of 0.190, while the mean for non-violators sample is 0.108 with a standard deviation of 0.125. A difference of means between the two samples statistically significant at $p < 0.001$.

Table A.3: Top 15 Countries by Predicted Relevancy

Country	Year	Relevancy Score
Russia	1940	.346
Germany	1940	.322
Russia	1941	.266
Russia	1980	.259
Russia	1981	.236
China	1979	.229
China	1980	.229
China	1968	.218
France	1940	.216
China	1981	.210
China	1967	.209
Russia	1979	.207
China	1987	.205
China	1978	.196
China	1965	.190

Note: Relevancy is the predicted probability of selecting into the "at-risk" sample.

It is worth noting that, while the weights are largely driven by *territorial threat* (as indicated by Table 1 in the manuscript), there are other factors that contribute to their construction. For the sake of completeness, we also report the top 15 country-years based

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

Table A.4: Top 15 Countries by Territorial Threat

Country	Year	Territorial Threat
Germany	1940	.718
France	1940	.714
Russia	1940	.603
Italy	1940	.603
Italy	1941	.599
Germany	1941	.599
Spain	1941	.599
Russia	1941	.599
Russia	1945	.572
China	1945	.572
Yugoslavia	1941	.569
China	1944	.532
Russia	1944	.532
Hungary	1941	.528
Hungary	1945	.517

Note: Territorial threat ranking based on mean score from 10 draws.

only on *territorial threat* in Table A.4. While the highest territorial threat scores occur during World War II and are primarily in Europe, the highest relevance scores cluster around 1940 and 1980, with China and Russia having the multiple observations included in the list. Among the 15 country-years reported each in Tables A.3 and A.4, there are 5 and 6 alliance violations, respectively. Given that there are 70 violations within the data set, that so many of the states included in these top-15 lists violate their alliances in the identified year offers some face validity for both the model's predictive power (based on the *relevance* predicted probabilities) and the *territorial threat* measure.

Robustness

Next, we report several additional models in Tables A.5–A.7. The models in Table A.5 are various reduced models that examine the sensitivity of our main results. The models in Table A.6 account for *democracy* and *territorial threat* in a variety of ways: including democracy in the *relevance* equation, excluding democracy or any derivations (i.e. democratic neighbors), measuring the minimum territorial threat of the alliance (weak link), and accounting for whether both alliance partners are democracies. Finally, Table A.7 uses alternative measures of *territorial threat* and an alternative sample: looking at the threat level

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

at formation, both formation and over time, uses the spatial variable capturing the average neighbor's threat, and lastly a sample for the 1950–2001 period.[2]

Looking across these models, starting with the relevance equation, we find that territorial threat is consistently able to differentiate among alliance types—i.e. territorial threat is more likely to lead to alliance terminations. The outcome equation, which is the *reliability* specification from Leeds, Mattes and Vogel (2009), demonstrates that the two primary variables of interest—democracy and change in a leader's societal coalition—are not consistent predictors of alliance violation, once they are conditioned by relevance. Democracy is only statistically significant in one model, and it has a positive coefficient, meaning that democracies are more likely to violate their alliances. These results, of course, strongly contradict the argument that democracies are less likely to abrogate their treaties. The generally negligible effects (with the only significant result running in the wrong direction) only emphasizes our conclusion that democracy is not an accurate predictor of alliance violators once the territorial threat environment is considered. Moreover, change in leader coalition is positive, but the variable is statistically significant in only three of the fourteen models.

[2]We look at a sub-sample since alliance compliance rates decline dramatically pre- and post-WWII (Berkemeier and Fuhrmann 2018).

Table A.5: Robustness Checks: Sensitivity Checks.

Model	Simple	Democratic Development	Full Relevance	Change in Alliance	Alliance Terms	Full Reliability
Outcome Equation						
Democracy	-0.498	0.545	0.563	1.488	2.293*	0.737
	(0.459)	(0.830)	(0.856)	(1.236)	(1.127)	(1.691)
Change in Leader's Societal Coalition	1.143*	11.925	13.451*	12.375	16.177*	4.440
	(0.476)	(12.030)	(2.725)	(28.918)	(7.559)	(2.771)
Change in International Power				1.988*		3.836
				(0.742)		(6.116)
Change in Political Institutions				0.263		1.886
				(0.643)		(2.606)
Change in External Threat				0.908		1.088
				(0.867)		(2.796)
Formation of New Outside Alliance				1.570*		3.099
				(0.693)		(4.865)
Asymmetry					-2.206*	-1.284
					(0.738)	(1.056)
Non-military Cooperation					-2.522*	-2.785*
					(0.886)	(1.116)
Ratification					2.671	0.831
					(1.454)	(3.492)
Military Cooperation					18.920*	5.029
					(2.154)	(3.777)
Time	0.029	0.053	0.116	-0.118	0.110	-0.175
	(0.073)	(0.110)	(0.117)	(0.141)	(0.154)	(0.459)
Time Squared	-0.005	-0.006	-0.009	0.001	-0.010	-0.002
	(0.005)	(0.006)	(0.007)	(0.007)	(0.009)	(0.011)
Time Cubed	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	-1.692	-0.380	-0.697	-2.071*	-1.211	-3.203
	(1.016)	(0.753)	(0.699)	(0.674)	(1.216)	(1.911)
Relevance Equation						
Territorial Threat	4.704*	4.270*	3.856*	3.658*	4.399*	3.841*
	(0.765)	(0.950)	(0.983)	(0.953)	(0.880)	(1.020)
Number of Borders		0.081	0.044	0.066	0.124*	0.145
		(0.066)	(0.069)	(0.066)	(0.056)	(0.107)
Proportion of Democratic Borders		-0.342*	-0.296	-0.330*	-0.276*	-0.328*
		(0.155)	(0.158)	(0.149)	(0.112)	(0.122)
Major Power			0.559	0.332	0.747*	
			(0.381)	(0.388)	(0.375)	
Rivalry			0.252	0.175	0.120	
			(0.372)	(0.386)	(0.385)	
Cold War			-0.039	0.186	0.471	0.419
			(0.266)	(0.278)	(0.289)	(0.549)
Economic Development			-0.231*	-0.216*	-0.192*	
			(0.078)	(0.075)	(0.075)	
Oil Producer			0.386	0.434	0.894*	
			(0.363)	(0.376)	(0.373)	
Constant	-3.112*	-4.345*	-4.519*	-4.457*	-5.460*	-4.766*
	(0.947)	(0.384)	(0.465)	(0.528)	(0.444)	(0.651)
Log-likelihood	-385.147	-376.432	-363.860	-349.690	-321.488	-315.989
Observations (Alliances)	6842 (234)	6811 (234)	6618 (234)	6543 (231)	6470 (226)	6582 (223)

Note: $*p < 0.05$, two-tailed. Standard errors in parentheses. Point estimates and standard errors were calculated from 5 draws using Rubin's (1987) formula for multiple imputation to account for uncertainty in the *territorial threat* instrumental variable.

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

Table A.6: Robustness Checks: Democracy.

Model	Democracy Directly	No Democracy	Weak Link	Democratic Alliances
Outcome Equation				
Democracy	2.518	0.545	1.028	1.633
	(2.021)	(1.090)	(4.334)	(1.875)
Change in Leader's Societal Coalition	7.369	5.179	5.132	5.331
	(6.126)	(2.799)	(11.679)	(6.029)
Change in International Power	2.747*	3.260*	7.123	2.856
	(1.161)	(1.605)	(11.121)	(1.956)
Change in Political Institutions	1.634	1.613	1.786	1.644
	(1.000)	(1.257)	(1.836)	(1.147)
Change in External Threat	0.907	0.607	2.010	0.820
	(1.084)	(1.144)	(2.485)	(1.176)
Formation of New Outside Alliance	2.332*	2.487*	6.531	2.362
	(0.844)	(1.204)	(10.951)	(1.383)
Asymmetry	-1.367	-1.871*	-0.969	-1.542
	(0.794)	(0.944)	(1.361)	(0.907)
Non-military Cooperation	-2.792*	-3.362*	-2.466	-2.535*
	(1.236)	(1.084)	(1.667)	(1.161)
Ratification	2.390	1.669	-0.622	1.435
	(1.664)	(1.977)	(3.129)	(2.274)
Military Cooperation	3.449*	4.839*	7.098	5.117*
	(1.045)	(1.585)	(6.755)	(2.008)
Time	-0.200	-0.104	-0.151	-0.124
	(0.251)	(0.268)	(0.366)	(0.261)
Time Squared	0.001	-0.005	-0.006	-0.002
	(0.011)	(0.011)	(0.016)	(0.010)
Time Cubed	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	-3.748*	-2.612	-5.345	-3.265*
	(1.843)	(1.383)	(14.707)	(1.484)
Relevance Equation				
Territorial Threat	4.202*	4.835*		4.055*
	(0.910)	(0.963)		(0.978)
Territorial Threat (Weak Link)			2.490*	
			(0.934)	
Democratic Alliance (Both Members Democratic)				-0.548
				(0.514)
Number of Borders		0.045	0.164*	0.111
		(0.049)	(0.046)	(0.061)
Proportion of Democratic Borders			-0.357*	-0.283*
			(0.133)	(0.122)
Democracy	-1.120*			
	(0.558)			
Major Power	0.500	0.207	0.406	0.416
	(0.414)	(0.411)	(0.391)	(0.528)
Rivalry	0.040	0.046	0.206	0.024
	(0.375)	(0.373)	(0.412)	(0.395)
Cold War	0.459	0.481	0.211	0.438
	(0.272)	(0.293)	(0.252)	(0.301)
Economic Development	-0.126	-0.171*	-0.171*	-0.139
	(0.090)	(0.075)	(0.087)	(0.088)
Oil Producer	0.498	0.650	0.330	0.611
	(0.415)	(0.480)	(0.383)	(0.505)
Constant	-4.382*	-5.056*	-4.774*	-4.849*
	(0.508)	(0.472)	(0.422)	(0.574)
Log-likelihood	-313.662	-311.361	-312.871	-306.173
Observations (Alliances)	6395 (223)	6395 (223)	6395 (223)	6395 (223)

Note: *p <0.05, two-tailed. Standard errors in parentheses. Point estimates and standard errors were calculated from 5 draws using Rubin's (1987) formula for multiple imputation to account for uncertainty in the *territorial threat* instrumental variable.

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

Table A.7: Robustness Checks: Alternative Models.

	Threat Formation	Threat Formation and Over Time	Neighborhood Average	1950–2001
Outcome Equation				
Democracy	1.035	1.313	1.474	0.780
	(4.644)	(2.571)	(1.743)	(2.226)
Change in Leader's Societal Coalition	5.040	5.372	6.323	10.532
	(12.017)	(6.218)	(5.552)	(10.540)
Change in International Power	6.804	3.098	7.964	2.228*
	(13.460)	(4.011)	(6.141)	(0.922)
Change in Political Institutions	1.845	1.814	1.930	2.671
	(1.761)	(1.891)	(1.834)	(1.980)
Change in External Threat	1.953	0.882	2.072	-0.716
	(3.136)	(1.826)	(1.838)	(1.527)
Formation of New Outside Alliance	6.077	2.562	7.229	2.973*
	(13.419)	(3.011)	(5.551)	(1.314)
Asymmetry	-0.986	-1.577	-0.889	-1.778
	(1.318)	(1.089)	(1.199)	(0.953)
Non-military Cooperation	-2.360	-2.565*	-2.255	-2.724
	(1.416)	(1.297)	(1.197)	(3.130)
Ratification	-0.345	1.384	0.004	1.008
	(2.472)	(3.192)	(1.675)	(3.367)
Military Cooperation	6.833	5.086	7.725	6.015*
	(8.124)	(2.739)	(4.646)	(2.462)
Time	-0.171	-0.135	-0.084	-0.062
	(0.398)	(0.363)	(0.291)	(0.381)
Time Squared	-0.005	-0.002	-0.010	-0.003
	(0.021)	(0.011)	(0.012)	(0.015)
Time Cubed	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	-5.275	-3.242*	-7.200	-3.288
	(17.622)	(1.444)	(6.580)	(2.256)
Relevance (At-risk) Equation				
Territorial Threat		4.355*		6.542*
		(1.225)		(2.178)
Threat at Formation	-0.013	-1.243		
	(1.316)	(1.396)		
Territorial Threat (Average Neighbor)			0.510*	
			(0.142)	
Proportion of Democratic Borders	-0.388*	-0.289*	-0.305*	-0.073
	(0.127)	(0.120)	(0.117)	(0.245)
Number of Borders	0.189*	0.142	0.132*	0.008
	(0.061)	(0.078)	(0.050)	(0.127)
Major Power	0.412	0.386	0.177	-0.258
	(0.405)	(0.621)	(0.400)	(0.912)
Rivalry	0.299	0.059	0.294	-0.162
	(0.429)	(0.406)	(0.384)	(0.474)
Cold War	0.128	0.484	0.342	2.170*
	(0.262)	(0.356)	(0.273)	(1.006)
Economic Development	-0.176	-0.162	-0.165*	-0.166
	(0.091)	(0.089)	(0.076)	(0.106)
Oil Producer	0.334	0.622	0.463	1.349*
	(0.415)	(0.644)	(0.369)	(0.551)
Constant	-4.706*	-5.016*	-4.808*	-6.644*
	(0.442)	(0.678)	(0.404)	(1.235)
Log-likelihood	-315.381	-306.705	-309.193	-156.257
Observations (Alliances)	6395 (223)	6395 (223)	6395 (223)	4952 (139)

Note: $*p < 0.05$, two-tailed. Standard errors in parentheses. Point estimates and standard errors are calculated from 5 draws using Rubin's (1987) formula for multiple imputation to account for uncertainty in the instrumental variables.

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

Selection effects: Alliance formation

Whereas we assume that, once formed, alliances are weakly exogenous (see fn 9 in the main manuscript), one could argue that unobserved factors affect both alliances violations and their tenancy to form. To account for possible selection effects due to alliance formation, we model the alliance formation stage in two ways: (1) using an instrumental variable approach, and (2) estimating a censored probit where we treat alliance formation as the first stage and all of the variables from our main analysis (both the *outcome* and *relevance* equations) are included in the second stage.

The first approach is analogous to the Heckman (1979) two-step procedure for accounting for selection. We start by creating an instrument for *Pr(Ally)*—the predicted probability that a dyad has an alliance in a given year—by replicating Lai and Reiter's (2000) widely-cited study of alliance formation (using updated data from COW). To test for any possible error correlation between formation and violation, we also calculate the inverse Mills ratio, λ.[3]

The replication of Lai and Reiter (2000) is presented in Table A.8. The first model is a replication for the full time frame used by both Lai and Reiter (2000) and (Gibler and Wolford 2006). The second model sets the time period to 1919–2001 in order to match the data from our main analysis presented in the manuscript. The two models return similar estimates. We use the second model to construct the instrument variable *Pr(Ally)*, the predicted probability that a dyad has an alliance in a given year, and to calculate λ, the inverse Mills ratio.

Next, we add *Pr(Ally)* and the inverse Mills ratio to the model from the main analysis. We estimate the models with *Pr(Ally)* as split-sample logits—the same as our main analysis—but estimate models including λ as split-sample probit, as the inverse Mills ratio assumes that the error term follows a normal distribution in each equation (Heckman 1979; Winship and Mare

[3]The inverse Mills ratio is the ratio of the probability density function and the cumulative density function.

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences." The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

Table A.8: Alliance Formation, Replication of Lai and Reiter (2000).

Model:	Replication	Post-1918
Allied in Previous Year	4.040*	4.040*
	(0.017)	(0.019)
Joint Democracy	0.176*	0.064*
	(0.025)	(0.026)
Polity Difference	-0.010*	-0.014*
	(0.001)	(0.002)
Joint Religion	0.309*	0.314*
	(0.018)	(0.020)
Joint Language	0.369*	0.483*
	(0.025)	(0.030)
Joint Ethnicity	-0.040	-0.027
	(0.030)	(0.035)
Conflict Relations	-0.108*	-0.114*
	(0.038)	(0.044)
Joint Enemy	0.106*	0.054
	(0.027)	(0.030)
Amount of Threat	0.024*	0.014*
	(0.002)	(0.002)
Distance	-0.012*	-0.013*
	(0.000)	(0.000)
Major Power	-0.018	0.106*
	(0.023)	(0.028)
Learning	0.151*	0.149*
	(0.013)	(0.013)
Constant	-2.321*	-2.114*
	(0.025)	(0.029)
Log-likelihood	-12190.555	-10457.948
Observations	411,013	358,402

Note: $*p < 0.05$, two-tailed. Standard errors in parentheses.

1992). We estimate three models for each measure of alliance formation: a model accounting for alliance formation in the *relevance* equation, a model accounting for alliance formation in the *outcome* equation, and a model accounting for alliance formation in both equations. While theoretically we would expect any prior selection stage to affect the *relevance* equation, we estimate all three variations for both *Pr(Ally)* and λ, for the sake of completeness. The results are presented in Table A.9.

Neither *Pr(Ally)* nor λ approach statistical significance in any of the models, suggesting that alliance formation has little effect on subsequent alliance behavior. Moreover, the primary theoretical variables of interest—*territorial threat* and *democracy*—have the same signs and levels of significance as in the main analysis in the manuscript. These results are consistent with previous research that finds that alliance formation is generally uncorrelated with the subsequent behavior within the alliance (e.g., Gibler 2008).

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

Table A.9: Robustness: Accounting for Alliance Formation

Outcome Equation						
Democracy	0.056	0.580	0.071	0.347	0.611	0.409
	(2.537)	(3.264)	(2.446)	(1.250)	(0.884)	(1.471)
Change in Leader's Societal Coalition	1.694	1.729	1.706	0.967	0.957	0.970
	(3.796)	(3.684)	(3.776)	(1.230)	(0.836)	(0.988)
Change in International Power	8.104	7.538	8.071	3.929	3.413	3.776
	(4.948)	(8.941)	(5.188)	(4.372)	(2.531)	(4.395)
Change in Political Institutions	0.938	1.053	0.949	0.240	0.332	0.265
	(2.567)	(4.156)	(2.681)	(0.815)	(0.659)	(0.842)
Change in External Threat	0.359	0.696	0.370	0.115	0.224	0.134
	(2.104)	(3.877)	(1.980)	(0.804)	(0.691)	(0.707)
Formation of New Outside Alliance	5.170	4.840	5.144	2.519	2.121	2.398
	(4.587)	(10.876)	(4.776)	(3.818)	(2.150)	(3.694)
Asymmetry	-0.436	-0.460	-0.442	-0.458	-0.491	-0.474
	(1.967)	(2.733)	(1.986)	(1.061)	(0.750)	(0.970)
Non-military Cooperation	-2.115	-2.109	-2.129	-0.952	-0.968	-0.970
	(2.350)	(2.566)	(2.438)	(0.759)	(0.674)	(0.718)
Ratification	-2.242	-1.818	-2.227	-0.934	-0.694	-0.884
	(3.154)	(2.441)	(3.157)	(1.713)	(0.982)	(1.618)
Military Cooperation	6.245**	6.994	6.297	3.247	3.416**	3.316*
	(3.116)	(5.231)	(3.969)	(2.048)	(1.547)	(1.907)
Time	-0.798	-0.728	-0.797	-0.340	-0.311	-0.334
	(0.729)	(0.780)	(0.721)	(0.257)	(0.203)	(0.263)
Time Squared	0.027	0.024	0.027	0.012	0.010	0.011
	(0.026)	(0.030)	(0.026)	(0.010)	(0.008)	(0.011)
Time Cubed	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Pr(Ally)		1.355	0.089			
		(1.906)	(2.671)			
λ					-1.316	-0.380
					(1.433)	(3.232)
Constant	-1.515	-3.071	-1.576	-1.054	-0.569	-0.867
	(5.472)	(11.554)	(4.893)	(2.244)	(1.819)	(2.841)
Relevance (At-risk) Equation						
Territorial Threat	2.795**	3.023**	2.804**	1.270*	1.380**	1.292*
	(1.377)	(1.354)	(1.430)	(0.652)	(0.594)	(0.694)
Proportion of Democratic Borders	-0.135	-0.149	-0.135	-0.054	-0.062	-0.055
	(0.151)	(0.151)	(0.154)	(0.065)	(0.063)	(0.071)
Number of Borders	0.046	0.053	0.046	0.021	0.027	0.022
	(0.081)	(0.097)	(0.083)	(0.042)	(0.038)	(0.046)
Cold War	0.114	0.093	0.117	0.034	0.025	0.038
	(0.401)	(0.395)	(0.422)	(0.166)	(0.149)	(0.164)
Economic Development	-0.111	-0.098	-0.110	-0.052	-0.045	-0.051
	(0.097)	(0.109)	(0.099)	(0.038)	(0.039)	(0.040)
Oil Producer	0.670	0.733	0.673	0.293	0.329	0.301
	(0.483)	(0.709)	(0.517)	(0.244)	(0.224)	(0.268)
Major Power	-0.019	-0.084	-0.020	0.016	-0.003	0.016
	(0.475)	(0.572)	(0.472)	(0.217)	(0.219)	(0.214)
Rivalry	-0.090	-0.050	-0.090	-0.046	-0.038	-0.047
	(0.432)	(0.512)	(0.432)	(0.183)	(0.185)	(0.187)
Pr(Ally)	0.658		0.642			
	(0.514)		(0.784)			
λ				-0.450		-0.396
				(0.381)		(0.674)
Constant	-4.793***	-4.307***	-4.784***	-2.045***	-2.235***	-2.072***
	(0.633)	(0.506)	(0.676)	(0.296)	(0.208)	(0.423)
Log-likelihood	-245.073	-245.615	-245.073	-245.548	-245.860	-245.536

Note: *p <0.05, two-tailed. Standard errors in parentheses. *Territorial threat* measure is mean from 10 draws.

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences." The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

Next, we estimate a series of censored probit models, where alliance formation is the first (selection) stage in each model. First, we estimate a censored probit model where the outcome equation includes only those variables from Leeds, Mattes and Vogel (2009); that is, the *relevance* equation is omitted. Second, we include the probability that an observation is "relevant"—$Pr(R_i)$—based on split-sample probit estimates using the same specification as the main model of the manuscript. That is, we re-estimate the main model as a split-sample probit, and calculate the predicted probabilities based on the *relevance* equation, so that $\hat{R}_i = \Phi(Z_i\gamma)$ from the likelihood displayed in Equation 5 of the manuscript, where Z_i are the observed data, γ are parameter estimates, and Φ is a normal link function. We then include $\hat{R}_i$ as a predictor in the outcome equation of the censored probit. Third, we estimate a model where all of the variables from the *relevance* equation are included as independent variables in the outcome equation of the censored probit. The results of these models are reported in Table A.10.

Once again, there is little evidence that alliance formation affects subsequent alliance behavior. *Rho*, the estimate of the error correlation between equations, is small in magnitude and fails to reach any conventional level of statistical significance in any of the models. This suggests that unobserved factors do not correlate across the equations; that is, there is no evidence of any unmodeled factors affecting both alliance formation and violation.

Of the primary variables of interest, it is worth noting that *democracy* is only significant at the .1-level of a one-tailed test in the first model, and does not come close ($p > .62$ and $p > .78$) in the other two models, where the relevancy variables are accounted for. In contrast, $Pr(R_i)$ and *territorial threat* are statistically significant. Finally, looking at the log-likelihood, we can see that the models that account for the *relevancy* equation, either as a predicted probability or by including each it its constitutive terms, significantly improves model fit.

Taking the results from across each strategy together, there is little evidence that alliance formation affect whether states violate their alliance. There continues to be evidence,

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

Table A.10: Robustness: Accounting for Alliance Formation, Censored Probit

Democracy	-0.370	-0.131	0.093
	(0.269)	(0.271)	(0.333)
Change in Leader's Societal Coalition	0.382	0.429	0.353
	(0.275)	(0.294)	(0.320)
Change in International Power	0.398*	0.391*	0.351*
	(0.153)	(0.162)	(0.174)
Change in Political Institutions	0.008	0.085	0.059
	(0.170)	(0.194)	(0.209)
Change in External Threat	-0.078	-0.100	-0.102
	(0.134)	(0.133)	(0.151)
Formation of New Outside Alliance	0.631*	0.532*	0.488*
	(0.120)	(0.129)	(0.152)
Asymmetry	-0.346*	-0.534*	-0.565*
	(0.152)	(0.172)	(0.210)
Non-military Cooperation	-0.345*	-0.337*	-0.236
	(0.124)	(0.122)	(0.159)
Ratification	-0.407*	-0.322	-0.252
	(0.176)	(0.182)	(0.178)
Military Cooperation	0.155	0.227	0.230
	(0.110)	(0.121)	(0.120)
Time	-0.012	0.001	0.008
	(0.031)	(0.034)	(0.037)
Time Squared	0.000	-0.000	-0.000
	(0.002)	(0.002)	(0.002)
Time Cubed	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Pr(R_i)		4.520*	
		(1.002)	
Territorial Threat			1.041*
			(0.433)
Proportion of Democratic Borders			-0.045
			(0.071)
Number of Borders			0.029
			(0.039)
Cold War			-0.184
			(0.150)
Economic Development			-0.058
			(0.050)
Oil Producer			0.480*
			(0.176)
Major Power			0.069
			(0.246)
Rivalry			0.172
			(0.214)
Constant	-2.203*	-2.444*	-2.776*
	(0.267)	(0.301)	(0.356)
Selection Equation			
Allied in Previous Year	3.843*	3.867*	3.867*
	(0.083)	(0.087)	(0.087)
Joint Democracy	-0.555*	-0.559*	-0.559*
	(0.174)	(0.176)	(0.176)
Polity Difference	-0.029*	-0.029*	-0.029*
	(0.007)	(0.008)	(0.008)
Joint Religion	0.007	-0.025	-0.025
	(0.096)	(0.096)	(0.096)
Joint Language	-1.099*	-1.078*	-1.078*
	(0.203)	(0.203)	(0.203)
Joint Ethnicity	0.369*	0.325*	0.325*
	(0.151)	(0.150)	(0.150)
Conflict Relations	-0.047	-0.072	-0.072
	(0.074)	(0.075)	(0.075)
Joint Enemy	0.093	0.087	0.087
	(0.063)	(0.065)	(0.065)
Amount of Threat	0.059*	0.062*	0.062*
	(0.013)	(0.013)	(0.013)
Distance	-0.017*	-0.018*	-0.018*
	(0.002)	(0.002)	(0.002)
Major Power	1.007*	1.010*	1.010*
	(0.124)	(0.127)	(0.127)
Learning	-0.283*	-0.291*	-0.291*
	(0.049)	(0.050)	(0.050)
Constant	-3.327*	-3.368*	-3.368*
	(0.232)	(0.243)	(0.243)
Rho	-.010	-0.142	-0.148
	(0.141)	(0.116)	(0.111)
Log-likelihood	-4181.382	-4030.248	-4025.140

Note: $*p < 0.05$, two-tailed. Standard errors in parentheses. *Territorial threat* measure is mean from 10 draws.

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

however, that alliances themselves vary in terms of how likely they are to enter the "at-risk" pool of alliances, and that this variation is largely driven by their political environment.

Indirect democratic effects

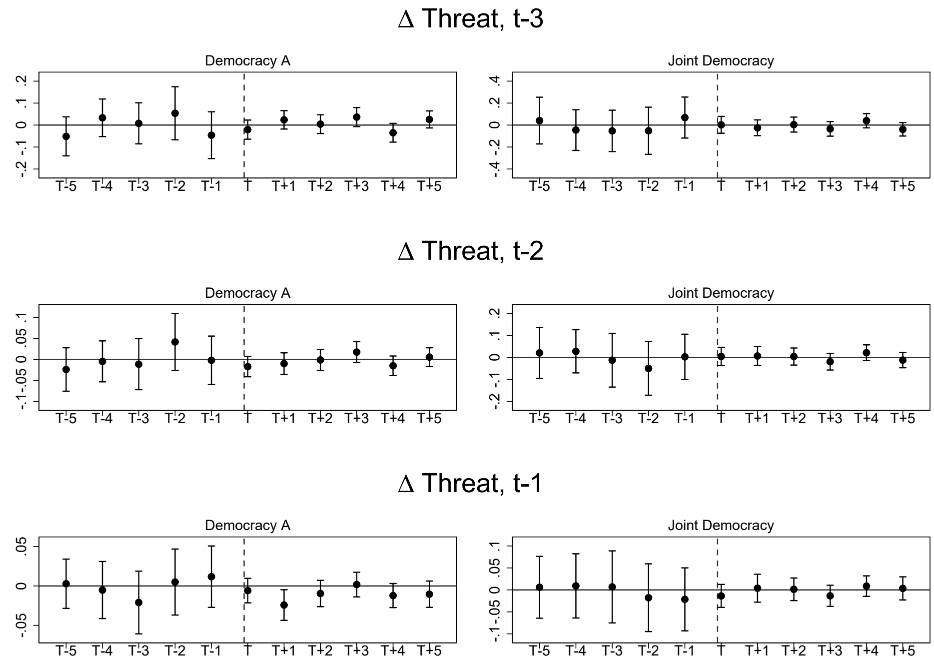
An alternative argument to the one we present in the article is that democratic institutions may reduce the propensity of states to violate alliances by creating a more peaceful environment. If alliances produce peace, then alliances with democratic members may serve as an indirect pathway in which alliances reduce threat. We explore this in two ways: first, using an intervention analysis to see whether alliances consisting of democracies are more pacifying than those of non-democracies and, second, via mediation analysis.

To investigate the effect of bilateral alliances on peace, we conduct an intervention analysis of alliance formation to compare democratic and non-democratic states. An intervention analysis allows us to see whether the effect of alliance membership effects the threat level of democracies and non-democracies differently in a systematic way. If it is the case that democratic alliances are especially likely to reduce threat levels, we would expect democracies to have systematically greater reductions in threat levels in the years following the treatment of alliance formation than non-democracies.

For this analysis, we calculated change in threat levels over time for each alliance member in our sample. We calculated the change in the territorial threat from three years prior to the current state-year, from two years prior, and from the previous state-year. We then used these as dependent variables in an OLS regression predicted by two dummy variables—one of the presence of a democracy in State A of the alliance and one of joint democracy in the alliance. We estimated these regressions at the year of alliance formation and for years one through five after the alliance was formed. In terms of causal inference, this specification is a simple difference-in-difference design, as the treatment is the formation of a democratic alliance while the control is a non-democratic alliance. We also estimate models for the five years *prior* to alliance formation, to evaluate the parallel trends assumption (i.e. both

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

Figure A.2: Predicting Threat Changes: t-3, t-2, and t-1 Years



the treated and control cases have the same pre-intervention trend), to ensure a reasonable counterfactual for the treated cases.

Our results are displayed in Figure A.2. The three dependent variables are each displayed in their own row (in descending order from longest change to shortest change), while the coefficients and 95% confidence intervals for the two key independent variables are displayed in columns (*democracy in state A* on the left, *joint democracy* on the right). The year of intervention (alliance formation) is highlighted with a dashed line, with the five years before and after the intervention on either side. These results demonstrate well that the regime type of the alliance member does not affect the level of threat. While the level of certainty associated with a change in threat increases after alliance formation compared to before, as indicated by the smaller confidence intervals to the right of the dashed line than to the left, there is no discernible pattern of statistically significant effects, let alone one in which democratic alliances are more peaceful. This implies that alliances do not serve as a tool by which democracies can lower the threat environment.

We also conduct a mediation analysis in order to assess whether *territorial threat* acts as a mediator for democratic alliances. Since our dependent variable of alliance violation is binary, we follow the procedures outlined on Imai, Keele and Tingley (2010, 316–317). Imai, Keele and Tingley (2010) note that binary outcome variables require a relaxation of the linearity assumption used with traditional mediation analysis, and provide a generalized framework. In particular, they suggest an algorithm where (1) outcome and mediator equations are fit, (2) model parameters are simulated from their sampling distribution, (3) potential values of the mediator are simulated, potential outcomes are simulated with the simulated mediator values, and causal mediation effects are calculated, and (4) summary statistics are computed. Following their advice, we use 1000 simulations to estimate the direct, indirect, and total effects of democracy on alliance violation.

We estimate two models, the first looking at overall effect of the *democracy* (based on the main model in the manuscript), and the second focusing on *democratic alliances*. *Territorial threat* is treated as the mediator in each model. The results are reported in Table A.11. The top of the table reports the coefficients and standard errors of a split sample logit, while the bottom of the table reports the point estimate and confidence intervals for the mediation analysis based on the 1000 simulations.

The top of the table is consistent with previous results, so we instead focus on the mediation analysis. We find that neither *democracy* nor *democratic alliances* have any effect—indirect or direct—that is statistically distinct from zero. These results suggest that democracy is not mediated through territorial threat.

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

Table A.11: Mediation Analysis: Democracy, Territorial Threat, and Alliance Violations.

Outcome Equation				
Democracy	1.369	(1.885)	1.633	(1.875)
Change in Leader's Societal Coalition	5.537	(5.376)	5.331	(6.029)
Change in International Power	2.982	(2.150)	2.856	(1.956)
Change in Political Institutions	1.699	(1.247)	1.644	(1.147)
Change in External Threat	0.756	(1.223)	0.820	(1.176)
Formation of New Outside Alliance	2.433	(1.543)	2.362	(1.383)
Asymmetry	-1.629	(0.896)	-1.542	(0.907)
Non-military Cooperation	-2.655*	(1.196)	-2.535*	(1.161)
Ratification	1.546	(2.302)	1.435	(2.274)
Military Cooperation	4.945*	(2.325)	5.117*	(2.008)
Time	-0.121	(0.269)	-0.124	(0.261)
Time Squared	-0.003	(0.010)	-0.002	(0.010)
Time Cubed	0.000	(0.000)	0.000	(0.000)
Constant	-3.229*	(1.495)	-3.265*	(1.484)
Relevance (At-risk) Equation				
Territorial Threat	4.116*	(0.993)	4.055*	(0.978)
Democratic Alliance			-0.548	(0.514)
Proportion of Democratic Borders	-0.291*	(0.122)	-0.283*	(0.122)
Number of Borders	0.121	(0.062)	0.111	(0.061)
Major Power	0.416	(0.510)	0.416	(0.528)
Rivalry	0.004	(0.398)	0.024	(0.395)
Cold War	0.450	(0.305)	0.438	(0.301)
Economic Development	-0.153	(0.083)	-0.139	(0.088)
Oil Producer	0.674	(0.505)	0.611	(0.505)
Constant	-4.983*	(0.548)	-4.849*	(0.574)
Mediation Analysis				
Mediation Effect	-0.00011	(0.00039)	0.00005	(0.00025)
Direct Effect	0.00034	(0.00211)	0.00040	(0.00442)
Total Effect	0.00023	(0.00207)	0.00045	(0.00445)

Note: *p <0.05, two-tailed. Standard errors in parentheses. *Democracy* is the Treatment in model 1, while *democratic alliance*is the treatment in model 2. *Territorial threat* is the mediator in each model, and is measured as the mean from 10 draws. Mediation, direct, and total effects estimated using an algorithm proposed by Imai, Keele and Tingley (2010) with 1000 simulations. Mediation analysis reports 5 spots after the decimal to show any effects.

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

4 *Stata* Code to Implement the Split-population Logit

We include *Stata* code of the program we wrote to estimate the split-population logit. For shorthand, *DV* represents the binary outcome variable, *IVO* represents the regressors in the *outcome* equation, and *IVR* represents the regressors in the *relevance* equation. We outline what each line of code does below.

Stata code:

```
program define spl_lf, rclass
    args lnf beta gamma
    tempvar rel violate
        quietly gen double ‘rel’ = 1/(1+exp(-‘gamma’))
        quietly gen double ‘violate’ = 1/(1+exp(-‘beta’))
        quietly replace ‘lnf’ = ‘lnf’ = ln((1-‘rel’)+(‘rel’*(1-‘violate’))) if $ML_y1==0
        quietly replace ‘lnf’ = ‘lnf’ = ln((‘rel’)*(‘violate’)) if $ML_y1==1
end
ml model lf spl_lf (DV = IVO) ( = IVR)
ml maximize
```

The first line defines that we are creating a program; the second and third line specifies the arguments (parameters to be specified), while the fourth and fifth lines creates two temporary variables (i.e. the two equations). Next, the sixth and seventh lines specify the likelihoods to be summed for $Y = 0$ and $Y = 1$, respectively, while line eight ends the program. Note that line six, specifying the likelihood when $Y = 0$, treats the outcomes as coming from two distinct processes, i.e. a mixture model, as $Y = 0$ can occur because either (a) the observation is not relevant (“1-‘rel”’) or (b) the observation is relevant but there is no violation (“ ‘rel’*(1-‘violate’)”). $Y = 1$ occurs only if the observation is relevant and a violation occurred.

Lines nine and ten implement the program and maximize the likelihood. The variables are specified in line nine, with the equation from the first set of parentheses providing the independent variables (on the right hand side of the equal sign) for the ‘beta’ argument and the second set of parentheses providing the independent variables for the ‘gamma’ equation.

Any desired options, such as estimating clustered standard errors or choosing an alternative maximization algorithm, can be specified after the parentheses. Finally, the likelihood is maximized in line ten.[4]

[4]As with other mixture models, it may be helpful to specify initial conditions to help identify the global maximum.

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

5 Alliance Violators

Table A.12 provides information about the cases of alliance violations. Alliance violation data are from Leeds, Mattes and Vogel (2009). In addition to State A (the violator), State B (the state with whom the agreement is violated), and the year, we also report three other pieces of information regarding State A: its level of *territorial threat*, whether it experienced a *change in leader's societal coalition*, and whether it is a *democracy*. *Territorial threat* is the mean predicted probability from 10 draws of the estimated distribution of the maximum predicted territorial threat from the model reported in Table A.1. *Change in leader's societal coalition* and *democracy* are from Leeds, Mattes and Vogel (2009).

Table A.12: List of Abrogated Alliances.

State A	State B	Year	Territorial Threat	Δ in Leader's Societal Coalition	Democracy
Germany	Russia	1933	.0134181	1	0
France	Italy	1935	.0194196	1	1
Turkey	Italy	1935	.0438603	0	0
Greece	Italy	1935	.0658665	0	1
Belgium	France	1936	.0074095	0	1
Italy	Spain	1936	.0549720	0	0
Russia	Czechoslovakia	1938	.2272077	0	0
France	Czechoslovakia	1938	.1936811	0	1
Germany	Austria	1938	.1865337	0	0
Russia	Poland	1939	.279217	0	0
France	Germany	1939	.2953013	0	1
Russia	Finland	1939	.279217	0	0
Italy	Albania	1939	.1462826	0	0
Russia	France	1939	.279217	0	0
Russia	Lithuania	1940	.5524079	0	0
Yugoslavia	Romania	1940	.2755803	0	0
Russia	Estonia	1940	.5524079	0	0
Germany	Denmark	1940	.6677183	0	0
Thailand	United Kingdom	1940	.0000000	0	0
Russia	Latvia	1940	.5524079	0	0
Italy	Russia	1941	.5609003	0	0
Germany	Russia	1941	.5609003	0	0
Russia	Iran	1941	.5609003	0	0
Italy	Germany	1943	.259393	0	0
Russia	Japan	1945	.5433966	0	0
Russia	Turkey	1945	.5433966	0	0
Russia	Yugoslavia	1949	.4135729	0	0
Albania	Yugoslavia	1949	.0933776	0	0
Hungary	Yugoslavia	1949	.0779969	0	0
Bulgaria	Yugoslavia	1949	.0941740	0	0
Poland	Yugoslavia	1949	.015158	0	0
Czechoslovakia	Yugoslavia	1949	.0170141	0	0
Romania	Yugoslavia	1949	.0794406	0	0
Afghanistan	Turkey	1950	.1850240	0	0
Egypt	United Kingdom	1951	.2974145	0	0
Russia	France	1955	.2527492	0	0
Russia	United Kingdom	1955	.2527492	0	0
Egypt	United Kingdom	1956	.3046337	0	0
Jordan	United Kingdom	1957	.2971661	0	0
Iraq	Jordan	1958	.176082	1	0
Iraq	United Kingdom	1959	.1818257	0	0
Mali	France	1960	.0829011	0	0
Egypt	Yemen Arab Republic	1961	.2875846	0	0
Saudi Arabia	Yemen Arab Republic	1962	.1485351	0	0
Nigeria	United Kingdom	1962	.0385331	0	1
Saudi Arabia	Egypt	1962	.1284466	0	0
France	Morocco	1966	.0029804	0	1
Egypt	Yemen Arab Republic	1967	.3355091	0	0
Libya	United Kingdom	1970	.0069660	0	0
Madagascar	France	1973	.0000000	1	0
Tunisia	Libya	1974	.0015907	0	0
United Kingdom	South Africa	1975	.0149923	0	1
Egypt	Russia	1976	.1617086	0	0
Iraq	Egypt	1977	.1838835	0	0
Somalia	Russia	1977	.1971040	0	0
Uganda	Sudan	1979	.1853800	1	0
Russia	Afghanistan	1979	.4478039	0	0
Iran	United States	1979	.3403858	1	0
United States	Taiwan	1980	.0682471	0	1
Syria	Libya	1980	.1067835	0	0
Niger	Libya	1981	.0030048	0	0
Chad	Libya	1982	.1290733	1	0
Algeria	Libya	1984	.0460337	0	0
Sudan	Egypt	1985	.1514078	0	0
Morocco	Libya	1986	.0980619	0	0
Malta	Russia	1987	.0000000	1	1
Senegal	Gambia	1989	.0008766	0	0
Jordan	Saudi Arabia	1990	.1075147	0	0
Russia	Iraq	1990	.2336497	0	0
Poland	Russia	1991	.1297963	1	1

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

6 Additional Application: International Trade

Our argument and results have implications beyond the alliance literature, raising concerns about a number of second-order findings associated with the democratic peace research program more broadly. As a preliminary test of how our theory applies to other "democratic differences" that we contend are actually due to a state's political environment, we apply our theoretical argument to international trade relations. Using a standard gravity model of bilateral trade, we find results consistent with our theoretical explanation. These results provide additional support for our contention that many characteristics attributed to democratic regimes are more tenuous than often described.

Applied to international trade, our theoretical argument is that any evidence of increased trade volumes among democracies is actually driven by the peaceful environment, in which democracies arise and thrive. The peaceful environment both encourages democratization and allows states to focus on international cooperation, e.g., trade. Thus, once we account for the nature of the political environment, we expect that the positive relationship between democracy and trade will weaken or disappear, as democratic regimes themselves are an artifact of a peaceful environment.

We test this prediction by regressing bilateral trade on an interaction between *democracy* and the latent *territorial threat* variable. Unlike in the alliance termination example, where the dependent variable is a censored binary outcome with partial observability, trade data are uncensored and measured on a continuous scale. Hence, for the case of the trade data, an OLS model with an interaction allows insights that are analogous to those obtained by estimating a split-population model on a censored binary dependent variable in the alliance example.[5] The split-population model, used for the alliance example, treats selecting into the "at-risk" sample as a type of functional form problem (Heckman 1979; Signorino and Yilmaz 2003), where the two cumulative distribution functions (one for the *relevance* equation and

[5]An alternative approach to modeling the conditional relationship would be to estimate a Gaussian Process regression (Carlson 2018).

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences." The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

the other for the *outcome* equation) are interacted to produce a joint outcome. In parallel, an interaction in the trade example treats the effect of *democracy* as conditional on *territorial threat*.[6] In other words, an interaction allows for isolating the direct effect of democracy in a way similar to what is achieved by a split-sample model, albeit in a more straightforward and interpretable way.[7]

For variable selection, we rely upon the canonical trade study by Rose (2004, 2074 citations). Rose uses OLS regression with fixed year-effects to estimate a standard gravity model for logged bilateral trade of 178 countries from 1948–1999 (for a detailed description of variables, see Rose 2004, 100). The unit of analysis is the (undirected) dyad-year. An exact replication is presented in Model 1 of Table A.13. Model 2 presents a benchmark model, including only those observations for which *territorial threat* data are available.[8]

As is common practice (e.g., Yu 2010; Decker and Lim 2009), we next add two variables to Rose's model, in order to account for the effect of democracy (in Model 3). The first variable—*Both Democratic*—equals 1 if both states in the dyad are democracies[9] in the given year, and 0 otherwise. The second variable—*One Democratic*—equals 1 if only one of the two states in the dyad is democratic in the given year.[10] Before we interact *democracy* with *territorial threat*, we find that the effect of *both democratic* is positive and statistically significant, while *one democratic* is positive and statistically significant, albeit at the $p < .1$-level. This suggests that having one democratic state within the dyad increases trade, and

[6]The interaction in the OLS could, of course, include a function of all of the *relevance* variables from the alliance example. We opt to focus on *territorial threat* since this is the key theoretical variable, as well as the only variable from the relevance equation (from the alliance example) that exerts much substantive influence on international trade.

[7]We do not interact the individual variables in the alliance example for several reasons, most notably for the reasons outlined earlier—our dependent variable is censored and partially observed. In addition, interacting explanatory variables is neither necessary nor sufficient to identify conditional relationship with binary outcome variables (Berry, DeMeritt and Esarey 2010), nor can interaction terms easily or directly account for censored or partially observed processes (Poirier 1980; Signorino and Yilmaz 2003).

[8]The difference in observations arises as Rose's data come from the IMF, which contains some countries/entities that are not included in the data gathered from either the Correlates of War (the basis for our *territorial threat* measure) nor the Polity IV (which is used to construct the binary democracy measure).

[9]As in the main model of the main manuscript, we code a state as a democracy if its Polity2 ≥ 6.

[10]Adding two separate variables, rather than combining them into a single ordinal variable is consistent with Rose's measurement of other variables, and allows us to separate the effect of joint democracy from just one democracy.

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

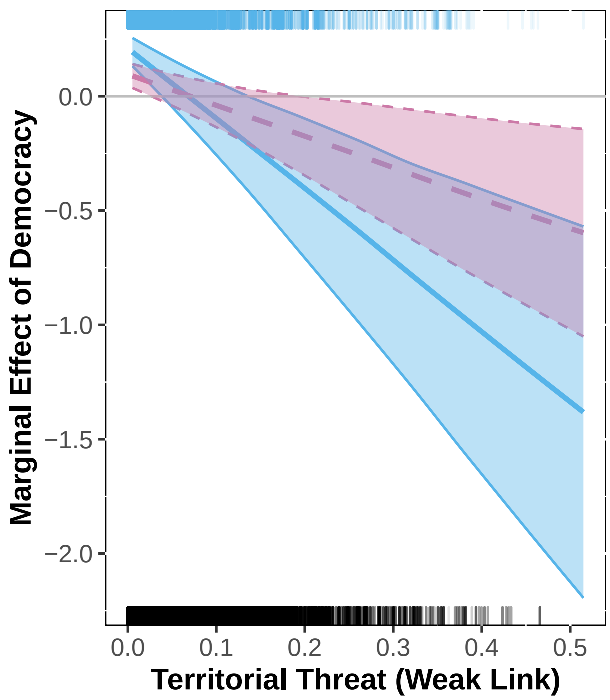
Table A.13: Political Environment, Democracy, and Bilateral Trade.

Model	Exact Rose Replication	Reduced Sample	Adding Democracy	Adding Threat
Both Democratic			0.139*	0.209*
			(0.043)	(0.046)
One Democratic			0.056	0.095*
			(0.032)	(0.034)
Territorial Threat (min)				0.241
				(0.380)
Both Democratic X Threat				-3.075*
				(0.822)
One Democratic X Threat				-1.350*
				(0.476)
Both in GATT/WTO	-0.042	-0.017	-0.046	-0.051
	(0.053)	(0.053)	(0.054)	(0.054)
One in Gatt/WTO	-0.058	-0.033	-0.048	-0.047
	(0.049)	(0.049)	(0.049)	(0.050)
GSP	0.859*	0.854*	0.841*	0.832*
	(0.032)	(0.032)	(0.032)	(0.032)
Log Distance	-1.119*	-1.122*	-1.123*	-1.126*
	(0.022)	(0.022)	(0.022)	(0.022)
Log Product Real GDP	0.916*	0.916*	0.914*	0.917*
	(0.010)	(0.010)	(0.010)	(0.010)
Log Product Real GDP/capita	0.321*	0.322*	0.314*	0.308*
	(0.014)	(0.014)	(0.014)	(0.014)
Regional FTA	1.199*	1.202*	1.180*	1.164*
	(0.106)	(0.108)	(0.107)	(0.108)
Currency Union	1.118*	1.127*	1.134*	1.129*
	(0.122)	(0.123)	(0.123)	(0.124)
Common Language	0.313*	0.310*	0.311*	0.308*
	(0.040)	(0.040)	(0.040)	(0.040)
Land Border	0.526*	0.521*	0.522*	0.525*
	(0.111)	(0.111)	(0.111)	(0.110)
Number Landlocked	-0.271*	-0.268*	-0.274*	-0.281*
	(0.031)	(0.031)	(0.031)	(0.031)
Number Islands	0.042	0.044	0.038	0.021
	(0.036)	(0.036)	(0.036)	(0.036)
Log Product Land Area	-0.097*	-0.095*	-0.096*	-0.098*
	(0.008)	(0.008)	(0.008)	(0.008)
Common Colonizer	0.585*	0.567*	0.574*	0.591*
	(0.067)	(0.068)	(0.068)	(0.068)
Ever Colonized	1.164*	1.166*	1.160*	1.156*
	(0.117)	(0.117)	(0.118)	(0.116)
Currently Colonized	1.075*	1.079*	1.095*	1.096*
	(0.235)	(0.235)	(0.235)	(0.236)
Common Country	-0.016	-0.016	-0.012	0.003
	(1.081)	(1.078)	(1.079)	(1.084)
Constant	-24.960*	-27.833*	-27.604*	-27.579*
	(0.407)	(0.370)	(0.377)	(0.376)
Observations	234597	233990	233990	233990
R-squared	0.648	0.648	0.648	.649

Note: $*p < 0.05$, two-tailed. Standard errors in parentheses. Point estimates and standard errors were calculated from 10 draws using Rubin's (1987) formula for multiple imputation to account for uncertainty in the *territorial threat* instrumental variable.

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

Figure A.3: Marginal Effect of Democracy on Trade at Varying Levels of Territorial Threat.



Note: The solid blue line represents the marginal effect of *both democratic* at varying levels of the dyad's minimum level of *territorial threat*, with the thin light blue lines indicating the 95% confidence interval. The dashed red line represents the marginal effect of *one democratic* at varying levels of the dyad's minimum level of *territorial threat*, with the thin light red lines indicating the 95% confidence interval. The blue rug plot at the top of the figure shows the distribution of dyads, which consist of two democratic states, while the black rug plot at the bottom shows the distribution of non-democratic dyads.

this is even stronger in magnitude if both states are democratic. These results are consistent with existing research in political science (Russett and Oneal 2001; Mansfield, Milner and Rosendorff 2002).

Next, in Model 4, we interact *democracy* with our primary theoretical variable of interest—*territorial threat*. We measure *territorial threat* as the minimum threat level within the dyad (following the weak-link logic). The reference category is zero democracies within the dyad. To make the interaction more interpretable, we plot the marginal effect of *both democratic* [blue solid line] and *one democratic* [red dashed line], with the associated 95% confidence intervals (same color and line style), in Figure A.3.

As is illustrated in the figure, at very low levels of territorial threat, dyads with one or

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

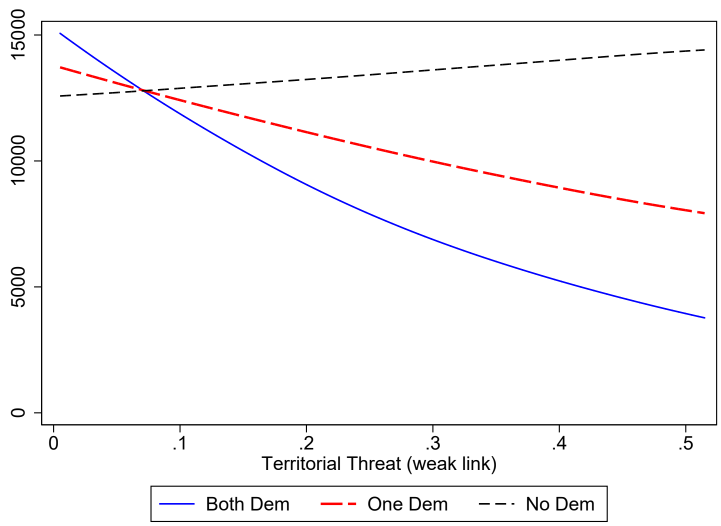
two democracies observe more bilateral trade than those consisting of no democracies. This positive effect dissipates quickly, however, as the threat level increases. Once threat reaches approximately .04, the difference between dyads with one or two democracies, and those with no democracies, is no longer statistically distinguishable. Finally, once the minimum threat level for pairs of democracies reach about .2, the associated marginal effect is *negative*. Similarly, once the threat level for dyads with one democracy reach about .15, the marginal effect is negative. That is, at moderate to high levels of threat, democratic dyads engage in less trade than dyads without democratic members.

The rug plot at the top of the figure shows the distribution of dyads, which consist of two democratic states, while the rug plot at the bottom shows the distribution of non-democratic dyads. Further reinforcing our argument, democratic dyads tend to cluster at low levels of territorial threat where the effect democracy on threat is positive. The previous literature's finding that democracy increases trade is, in other words, simply driven by a decreased frequency of democracies at higher levels of territorial threat, where their effect flips from positive to no effect to a negative effect. Modeling the effect of democracy as conditional on territorial threat, as we do here, helps elucidate this misconception.

To further enhance the interpretability of the results, we plot the predicted values of (unlogged) bilateral trade for dyads consisting of two democracies, one democracy, and no democracies, holding all other variables are their median values, in Figure A.4. The predicted values highlight the degree to which trade among democratic states is conditioned by their political environment. Democratic pairs are expected to see a loss of approximately 40% of bilateral trade by increasing the threat level from the around 0 (no threat) to .2 (high threat). Dyads with one democratic members experience much less dramatic decreases, but still observe a loss of approximately 20% over the same range.

Supplemental Material (not copyedited or formatted) for: Mark David Nieman, Douglas M. Gibler. 2023. "Peaceful Neighborhoods and Democratic Differences."
The Journal of Politics 85(1). DOI: https://doi.org/10.1086/720647.

Figure A.4: Predicted Level of Trade by Regime Type at Varying Levels of Territorial Threat.



References

Berkemeier, Molly and Matthew Fuhrmann. 2018. "Reassessing the Fulfillment of Alliance Commitments in War." *Research & Politics* 5(2):doi: 10.1177/2053168018779697.

Berry, William D., Jacqueline H.R. DeMeritt and Justin Esarey. 2010. "Testing for Interaction in Binary Logit and Probit Models: Is a Product Term Essential?" *American Journal of Political Science* 54(1):248–266.

Carlson, David George. 2018. Advanced Methods in Comparative Politics: Modeling without Conditional Independence PhD thesis Washington University in St. Louis.

Clarke, Kevin A. 2001. "Testing Nonnested Models of International Relations: Reevaluating Realism." *American Journal of Political Science* 45(3):724–744.

Clarke, Kevin A. 2003. "Nonparametric Model Discrimination in International Relations." *Journal of Conflict Resolution* 47(1):72–93.

Clarke, Kevin A. 2007. "A Simple Distribution-free Test for Nonnested Model Selection." *Political Analysis* 15(3):347–363.

Decker, Jessica Henson and Jamus Jerome Lim. 2009. "Democracy and Trade: An Empirical Study." *Economics of Governance* 10(2):165–186.

Gibler, Douglas M. 2008. "The Costs of Reneging: Reputation and Alliance Formation." *Journal of Conflict Resolution* 52(3):426–454.

Gibler, Douglas M. and Jaroslav Tir. 2014. "Territorial Peace and Democratic Clustering." *Journal of Politics* 76(1):27–40.

Gibler, Douglas M. and Scott Wolford. 2006. "Alliances, Then Democracy: An Examination of the Relationship between Regime Type and Alliance Formation." *Journal of Conflict Resolution* 50(1):129–153.

Heckman, James J. 1979. "Sample Selection Bias as a Specification Error." *Econometrica* 47(1):153–162.

Imai, Kosuke, Luke Keele and Dustin Tingley. 2010. "A General Approach to Causal Mediation Analysis." *Psychological methods* 15(4):309–334.

Lai, Brian and Dan Reiter. 2000. "Democracy, Political Similarity, and International Alliances, 1816-1992." *Journal of Conflict Resolution* 44(2):203–227.

Leeds, Brett Ashley, Michaela Mattes and Jeremy S. Vogel. 2009. "Interests, Institutions, and Reliability of International Commitments." *American Journal of Political Science* 53(2):461–476.

Mansfield, Edward D., Helen V. Milner and B. Peter Rosendorff. 2002. "Why Democracies Cooperate More: Electoral Control and International Trade Agreements." *International Organization* 56(3):477–513.

Poirier, Dale J. 1980. "Partial Observability in Bivariate Probit Models." *Journal of Econometrics* 12(2):209–217.

Rose, Andrew K. 2004. "Do We Really Know that the WTO Increases Trade?" *American Economic Review* 94(1):98–114.

Rubin, Donald B. 1987. *Multiple Imputation for Nonresponse in Surveys*. New York: John Wiley & Sons.

Russett, Bruce and John Oneal. 2001. *Triangulating Peace: Democracy, Interdependence, and International Organization*. New York: W.W. Norton.

Signorino, Curtis S. and Kuzey Yilmaz. 2003. "Strategic Misspecification in Regression Models." *American Journal of Political Science* 47(3):551–566.

Winship, Christopher and Robert D. Mare. 1992. "Models for Sample Selection Bias." *Annual Review of Sociology* 18:327–350.

Yu, Miaojie. 2010. "Trade, Democracy, and the Gravity Equation." *Journal of Development Economics* 91(2):289–300.