



# Reconceptualizing, Measuring, and Evaluating Distance and Context in the Study of Conflicts: Using Survey Data from the North Caucasus of Russia<sup>1</sup>

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How does political violence affect the attitudes and beliefs of affected populations? This question remains of central concern to the discipline of conflict studies. In response, we make the case (by empirical example) that the choice of spatial and temporal ranges of analysis influences conclusions about the associations between exposure to political conflict and subsequent opinions. Using 2005 survey data from Russia's North Caucasus and geo-referenced conflict data for the preceding 2 years, we find that violence affects levels of ethnic pride, trust in public institutions, and preferences for ethno-territorial separation, as well as other postwar attitudes. By designating a wide range of distance and time boundaries for capturing a conflict/attitude relationship, we argue for a more inductive style of analyzing theoretical propositions than is usually found in the field of conflict research. Our research is framed within the theoretical and empirical discussions of contextual-, neighborhood-, and community-level drivers of individual-level outcomes from the political geography and conflict studies literatures.

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How scholars conceptualize and measure context, place, and social setting is a critically important area of conflict research that has not received due attention. Political geographers and like-minded researchers in other social science disciplines have argued against the view that context should be treated as an unimportant influence or background annoyance in a statistical model, complicating efforts to make conclusions about observed social processes. Rather than thinking of individuals as bound by an arena of unobservable social circumstances that ought to be “controlled away” with a technical fix, in this paper, we argue for a careful measurement of the qualities of social context at multiple spatial and temporal dimensions (in this case, the contexts of vio-

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lence in the North Caucasus region of Russia). Furthermore, we demonstrate that variations in the geographic dimensions that researchers use to measure context (commonly also referred to as neighborhood, place, or locality) can have noteworthy influences on the reported findings of quantitative analyses. By varying the space-time ranges of a contextual variable (violence), our example represents an extension of the research design adopted in a number of conflict studies articles. Researchers, for example, investigate population sizes (Raleigh and Hegre 2009), poverty (Hegre et al. 2011), infrastructure such as international borders (Buhaug and Rød 2006), natural resources such as oil and gas (Basedau and Pierskalla 2013), or ethnic power composition (Rustad et al. 2011) and ethnic diversity (McDoom 2014) in their relation to risks of political violence; these social conditions of poverty or demographic diversity/heterogeneity can be considered qualities of the relevant social contexts. As we elaborate below, however, an ideal and logical extension of any study investigating such influences might incorporate spatial and temporal flexibility in the units of analysis. As we explain, analytical tools for such modeling are increasingly available and hold promise for future research (for example, Schutte and Donnay 2014).

We use public opinion survey responses and space-time disaggregated violent event data in the North Caucasus of Russia to develop our empirical argument and illustrate evidence for our claims about the need for careful consideration of the exact meaning of geographical context in operational terms. We focus our attention on an important question that has received a growing amount of attention by conflict scholars: How does violent conflict shape the subsequent views and opinions of affected populations? In the following section, we briefly review relevant literature in political geography and conflict studies, followed by an outline of some theoretical understandings of the constituent elements of social context. We also discuss issues related to the measurement of context for research questions whose answers may be influenced by geographical considerations. In the third section of the paper, we outline our North Caucasus case study and our theoretical expectations of how violence influences public opinion in this region. Furthermore, we elaborate upon how the scope or scale of measuring violence may affect any link between conflict and attitudes. In section four, we introduce the North Caucasus event data that capture the ebb and flow of conflict in that region over time and across space. In the fifth section, we present results of our multilevel modeling analysis. There are two components of the results section; the first presents varying estimates of the direct relationships between violence and attitudes, while the second illustrates the effects of different measurements of the context of violence when treated as a *control* variable in other regressions. Conclusions related to other indicators of interest in a model (for example, material well-being, education, etc.) can change as the dimension for measuring violent context shifts. In a final section, we conclude the study and integrate the results of earlier sections into an argument for careful and case-specific understandings of context that are essential for sound social science research. Difficult to measure effectively and concretely, clear best practices guidelines for measuring context in international studies research remains more of a desideratum than a key element of statistical models of political behavior and attitudes.<sup>2</sup>

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<sup>2</sup>An exception is Zhukov and Stewart (2013), who investigate how varying weights matrices that define neighborhoods in the international system can influence the results of conflict diffusion research. Our basic argument is similar, but we focus on a localized analysis of subnational relationships rather than on the country level and on the political dynamics of regions rather than on linkages between units of observation.

### Context and Place in Social Science

Over a century ago, Vidal De La Blanche (1903) described complicated and nuanced “*milleux*” in the study of political behaviors in France.<sup>3</sup> He identified patterns of social forces that were heterogeneous in their spatial distributions, and he identified certain regional formations and clusters of social processes that then existed. Since that time political geographers—and some like-minded social scientists that treat geographical as well as social effects—have dedicated their research efforts to identifying how people and place interact in a manner that creates the varying contexts of political behavior. In the field of International Relations (IR), Sprout and Sprout (1965), for example, used the term “operational milieu” to describe the social settings that conditioned individual-level decisions. Their model of an “ecological triad” explicitly includes relative and interactive types of effects operating simultaneously between an individual and his/her setting and also upon both elements. Such a line of thinking was influential in the development of a geographically sensitive vein of IR scholarship that was not purely state-centric and institutions-based. This scholarship, however, remained relatively unexamined during the Cold War years of bipolar confrontation and narrow modeling frameworks.

“Context” is generally taken to describe the social setting of any human behavior or activity, which includes voting behavior, boundary demarcation and protection, as well as intergroup conflict. Any study of these behaviors therefore implicitly studies the context in which a social process unfolds. However, fully embracing an understanding that such research relies on empirical definitions of context should warrant additional careful consideration of how it is measured and incorporated into research. Context can be likened to a container, or a forum for interaction among component parts of a whole. In the field of political geography, Agnew (1987:5) has defined context as the “settings and scenes of everyday life.” Instead of considering individuals to be atomic and independent from other individuals, their mutual interactions constitute observed social realities. Pattie and Johnston (2000), for instance, believed that “people who talk together vote together,” emphasizing the importance of interactions (and the tone and rapport of such interactions) in shaping social outcomes. Bayback and Huckfeldt (2002) similarly identified and measured the diffusion of information across personal networks and the role of that diffusion in shaping electoral behavior. Of course, the “container” that bounds these social interactions may vary in geographic dimensions or size (from a neighborhood block or apartment building to an electoral constituency to a region or country). According to the “structurationist” approach (Pred 1983), there exists a two-way interaction between people and their *milieux*. Unless carefully measured, an outer limit for the scale or social level at which people shape and are in turn shaped by their social environment remains speculative.

Especially at the traditional global level of IR research, multiple containers exist for a single person, in a nested hierarchical structure from the individual (where some theories of behavior are most appropriate) to the national (where theories of institutional interactions dominate). While the spatial dimensions that define social interactions may vary, so too should the rules governing, and principles defining, the forums in which individuals interact. Consider a neighborhood block as the range of a container for interaction. A neighborhood block in one area of a city can differ fundamentally from a block in another area, whether in terms of socioeconomic status, employment status, ethnic

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<sup>3</sup>More on these contextual considerations in the field of political geography are outlined in Linke and O'Loughlin (2015).



composition, age, or many other social qualities. Enos (2014), for example, illustrated how the social setting of intergroup contact between ethnic communities has important influences on individual-level attitudes about ethnic exclusion. Characteristics of an area, such as ethnic composition, can represent a baseline or foundation that guides the manner in which people engage with one another, the views that they hold about public and private life, and their perceptions of life outside of their own neighborhoods. However, to follow the example of ethnic composition, any measurement of inter-community diversity will vary as one zooms in and out from a given location; this effect of scale or range of analysis is thus an important influence that should be considered carefully.

While research devoted to the topic of contextual effects is often based in the field of electoral studies, our focus on political violence and attitudes returns to the question that Agnew (1987:60) posed: “Why is it, for example, that political violence characterizes the political histories of some places, but not others? Often this may have been the product of place-specific repression, or the absence of other alternatives such as electoral politics.” As social interactions in a given setting shape voting behavior, we test whether social settings of political violence also shape public opinion. Scholarly interest in the answer to this question has grown in recent years, and understanding how violence may affect public opinion has implications for the broad field of international studies (for example, Bakke, O’Loughlin, and Ward 2009; Balcelss 2012; Dyrstad 2012; Linke 2013).

In focusing on key predictors of human behavior, too many scholars still rely on methodological choices that “control away” the possible influences of social contexts on human behavior, or, in Gould’s (1970) phrase “throw out the baby with the bathwater.” Although spatial analysis is becoming more commonplace in disciplines outside geography, there still exist differences between geographers and others that are similar to those that were clarified in the debate about context (and/or how to model it) in *Political Geography* two decades ago (Agnew 1996; King 1996). The view of political geographers that the specific qualities of “place” (to the extent that they can possibly be measured) ought to be substantially considered and possibly incorporated into models—and thus interpreted as key explanatory factors of individual or local level phenomena—has recently gained traction. To return to the container analogy above, acknowledging that social processes unfold in a container with specific qualities and characteristics is one step in the right direction; researchers ought to be interested in measuring and understanding the contents of the container, the material it is built from, and all of the qualities it possesses. Even where local level data are used (increasingly so as a spatially disaggregated approach to conflict studies has become more popular in recent years), reconceptualizing the container itself is arguably as important as using fine resolution data.

Developing their analysis in line with well-established econometric practices (for example, Angrist and Pischke 2009), many international studies researchers accept that differences between units of observation can be important for the conclusions of a study. More specifically, most worry that unobserved and immeasurable variation between units will sully the data signal and bias their interpretation of hypothesis test results. The usual solution to this problem is to estimate a model, incorporating fixed effects for the level of the given unit. Consider a hypothetical study of poverty rates upon electoral participation in geographic subunits. Ideally, there would be an accurate estimate of the effect a given socioeconomic status indicator at the individual level (influence A, poverty) upon the outcome (result B, participation). We hope that the influence of A upon B is isolated from all other confounding influences characterizing the area where the voter lives. The spatial accessibility of polling stations could affect participation (influence C) if long queues and/or significant distances discouraged people from casting a ballot (see Gimpel and Schuknecht 2003). Without data for the distribution and density of polling stations, comparing individuals in

one geographic unit only to individuals in that same unit eliminates the possibility that differences in influence C between them are also responsible for the differences in participation rates (result B). One of the downsides to the fixed effects modeling approach is that while it may return an unbiased estimate of the poverty indicator by eliminating any possible differences between spatial units, it will not explain *how* any differences between units matter for the observed outcome. In this manner, therefore, geographical forces that condition the observed distribution of the phenomenon a researcher seeks to explain are thus excluded from consideration.

Without regard for the technical design of a given statistical estimator, how one defines the spatial dimensions of the containers for the social process that one is studying can be quite important—and this is where we focus our attention in this article. This point is related to the well-known Modifiable Areal Unit Problem (MAUP) (Openshaw 1983), which was built upon the statistical analysis of Gehlke and Biehl (1934). The consequences of MAUP are that the size and direction of a given statistical association that is found at one scale, level, or spatial resolution (for example, census tract) may not hold at others (for example, county) (Openshaw and Taylor 1979). A similar issue beyond the areal extent arises if the boundary of the analytical units changes shape. For example, in correlating socioeconomic class and Republican party votes, the coefficient varies across geographical scales as a result of the number of data points and the spatial configuration of the districts, and therefore, we cannot be sure which coefficient is correct (Openshaw 1996). For the study of conflict in the international system (and related to some of our examples below), related differences can be found in the study of ethnicity and conflict. The most commonly cited articles at the country level (for example, Fearon and Laitin 2003; Montalvo and Reynal-Querol 2005) have difficulty identifying whether conflict (usually civil war in such cases) actually begins and develops from areas of ethnic marginalization or in areas where a robust diversity of ethnicities interact (versus a socially homogeneous swath of land). Other research, in contrast, has been able to address these issues by zooming in from the country level to the scale at which conflict takes place within unstable countries. For example, Basedau and Pierskalla (2013) recently uncovered nuanced and interactive connections between ethnic marginalization, the presence of oil and gas, and intrastate violent conflict. Arguably, the most extreme example of a MAUP dilemma is the “ecological fallacy,” which arises when scholars infer a relationship at the individual level (for example, between income and propensity to support violence) based upon analysis of aggregate level (typically administrative unit or country level) data. Research on this topic is not new (for example, Robinson 1950; Selvin 1958), but has important implications for conflict research in international studies and for the use of surveys in conflict research. This is especially so because reliance on surveys is increasingly common, due to their ability to incorporate individual beliefs about the use of violence (Blair et al. 2013) and the effects of violence upon attitudes (see references above).

In recent years, there has been an increase in the number of procedures available for identifying the ideal/relevant dimension for the study of many geographically distributed social phenomena (for example, Root, Meyer, and Emch 2009; Spielman, Yoo, and Linkletter 2013). We argue that adopting these approaches for conflict research is strongly warranted. In studying violence in Iraq, Linke, Witmer, and O'Loughlin (2012) and Braithwaite and Johnson (2012), for example, carry out analyses where the territorial area defining reciprocal action/reaction social dynamics is allowed to vary in dimension. Across distance and time breaks, several qualities of a subnational social setting (income, ethnic composition) condition the strength of “tit-for-tat” violence (Linke, Witmer, and O'Loughlin 2012). Schutte and Donnay (2014) similarly consider the flexibility of analytical units to



be of great importance for making inferences about conflict processes and illustrate this advantage, using violent events data for insurgency in Afghanistan. Employing the various methods for defining contexts, however, requires spatially disaggregated and fine-resolution data because of the simple practicalities of data aggregation; it is impossible to know whether one level of analysis is more appropriate than other levels unless you can test the relationship at these multiple scales. In the study of electoral violence in Kenya, for instance, it is possible to test the effects of violence upon political beliefs and social attitudes across multiple distance thresholds as a robustness check of the main findings for a theoretically derived range (Linke 2013). Aggregating up from fine spatial resolutions (location/point-based data) to coarse (large areal-unit data) is relatively straightforward but disaggregating from coarse to fine resolutions is impossible (or at least very difficult, requiring calculations of uncertainty and heroic assumptions).

### **Russia's North Caucasus and Theoretical Propositions**

In the aftermath of the implosion of the Soviet Union in 1991, claims for autonomy and independence appeared in various Russian regions, most dramatically in the Chechen republic. After separatists declared independence, an intense concentration of violence in the republic (1994–1996) resulted in the “de facto” independence of Chechnya for 3 years (1997–1999). An attempt to spread the influence of the increasingly Islamist character of the Chechen leadership to adjoining (Muslim) republics, especially Dagestan, provoked a reaction from Moscow and the conflict resumed in August 1999. After a year of concentrated fighting for control of the Chechen capital, Grozny, and its surrounding population centers—and key Chechen leaders switching sides to support Moscow—the conflict took on an increasingly geographically dispersed character across the wider region (after 2001). Tit-for-tat killings, targeted assassinations of political and military figures, and mass arrests and disappearances were embedded in a guerrilla style conflict. Over time, the relative importance of Chechnya in the overall regional violence has dropped, while nearby republics have seen frequent acts of terrorism and brutal police–military responses (O’Loughlin, Holland, and Witmer 2011). As the conflict evolved and as the spatial reach of the militants based initially in Chechnya increased, public opinion in Russia responded in a time- and regional-variant manner. In the 1990s, a plurality of Russians, sometimes a majority, wished to be rid of Chechnya and pull troops out of the republic. When the attacks reached Moscow and other places far from Chechnya, public opinion rallied to the position of President Putin—that the rebellion should be crushed. In the North Caucasus, significant differences of opinion regarding the conflict and the state response are evident between the republics and between the many ethnic groups of the region.

Exposure to violence in unstable regions such as the North Caucasus has great potential to transform individuals’ perceptions of political institutions and other individuals. For example, if a person relies on the police or military for the provision of physical security (in this sense, trusting his/her well-being to an institutional apparatus) and then becomes a victim of an insurgent attack, such a person may have a less positive view of the police following the event. In addition to general social indicators, there is strong evidence in the literature that conflict affects political beliefs and behavior (Balcells 2012), and that trust can be influenced by individuals’ “local social and political contexts” (Levi and Stoker 2000:481). Consider an act of horrific violence like the Beslan school massacre in North Ossetia in 2004. Where the perpetrators are identified as members of an ethnic and/or religious community other than one’s own, we might expect that many individuals would experience an altered sense of intercommunal trust.

This may occur either if the individual were a direct or indirect victim or if he or she simply witnessed the event. Adding nuance to the argument that there is a direct link between violence and political beliefs, we believe that the strength of any association may be a result of physical spatial proximity to the conflict location. For example, the correlations between violence and lack of trust in the Beslan example might be stronger for a person living in the immediate vicinity of the school than for a person living further afield, who only witnessed the event remotely through television coverage, word of mouth, and press reports.

We make several specific propositions below, with the expected direction of the relationship and simple hypothetical mechanism explained beneath each. The hypothesized relationship is tested after controlling for all individual-level alternative explanations for the attitudes (including age, sex, poverty, education level, and rural location).

Proposition 1: Regional violence will increase ethnic pride within the group. Conflict will serve as a trigger, where, in an area fraught with politicized ethnic tensions and multiple groups, people will become suspicious of the intentions and actions of other communities. For the purposes of safety, political rewards, and cultural preservation, victims and witnesses of conflict will view co-ethnics favorably.

Proposition 2: Regional violence will reduce willingness to forgive perpetrators. Conflict in an area makes the effects of violence tangible to individuals. A person who has been exposed to the emotional and social effects of violence will be less willing to forgive perpetrators than their more fortunate peers who did not experience conflict in their locality.

Proposition 3: Regional violence will reduce generalized interpersonal trust. Where conflict has been especially severe, people are likely to have more suspicious views of the intentions and objectives of individuals and groups in their area. This is because violence that took place nearby was either carried out by people in the area or with some support (tacit or active) of some segment of the population in the broader community.

Proposition 4: Regional violence will increase the propensity of individuals to prefer territorial separation from other ethnic communities. Where major bouts of violence have taken place in the past, people will tend to blame members of other communities for the violence. (This is especially true if events have been perpetrated by members of another ethnic group, but even in cases whereby one's own group has initiated the violence, it will be viewed as defensive, given the circumstances of the conflict.)

Proposition 4b: The modified version of proposition four is that controlling for violence using different areal ranges will change the relationship between poverty and preferences for separation. We are interested in testing the relationship between socioeconomic status and preference for separation because existing research has found a link between poverty and similar attitudes about intergroup relationships in other postwar scenarios (O'Loughlin 2010).

Proposition 5: Regional violence will increase worries about terrorism and war, above the reported levels for all other social problems like unemployment and institutional political leadership. A seemingly intuitive connection, we wish to test this proposition in a confirmatory analysis and examine space-time definition effects.

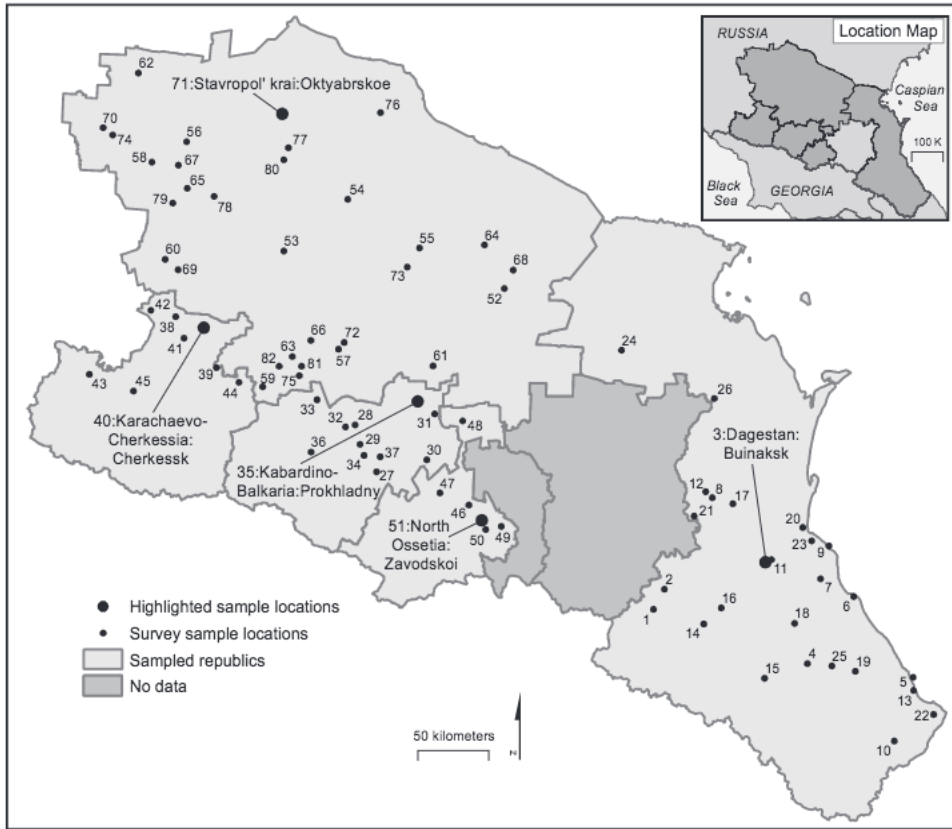


FIG 1. Survey Sample Locations Across the Study Area Region

(Notes. In each of the region's five republics, the 82 primary sampling point locations for the 2005 survey in the North Caucasus are mapped. Due to concerns about physical security, the survey was not carried out in Ingushetia or Chechnya. The highlighted locations are also noted in subsequent analysis (Figure 2 below) to ease the interpretation of our approach to modeling and understanding the regional context.)

### Data and Regional Context

We use survey and spatially disaggregated violent event data for the North Caucasus of Russia to test the propositions outlined above and to illustrate some of the measurement effects that we described earlier. Survey data for 2,000 individuals from the North Caucasus of Russia were collected in December 2005. Respondents were selected from 82 sampling locations using a geographically stratified strategy for North Ossetia, Dagestan, Karachevo-Cherkessia, Kabardino-Balkaria, and the territory of Stavropol (see Figure 1). At the time of the survey enumeration, Chechnya and Ingushetia were too violent to allow the survey company to carry out fieldwork in these republics; these two republics are thus excluded from the analysis. The locations of survey respondents are joined to the record of conflict instances during the 2 years before the December 2005 survey. Observed violence is recorded from Lexis–Nexis archives that include enough information to reliably record the date and precise location of each event, as well as other characteristics of the incident such as actor and type (for example, violence against civilians vs. government-insurgent interactions).



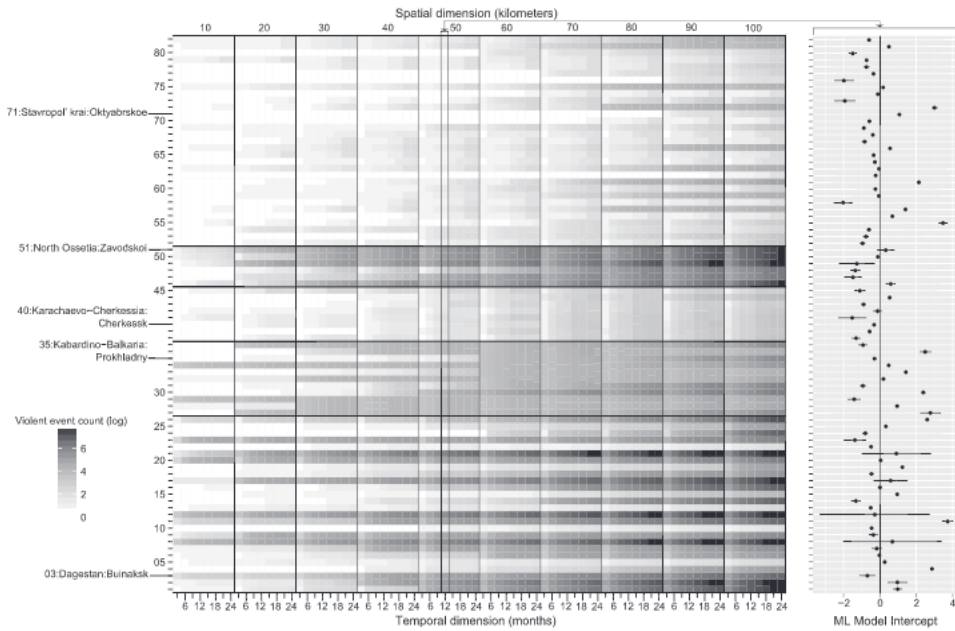


FIG 2. Violent Events Counts Across Space-Time Definitions of Context

(Notes. For every one of the 82 survey sampling locations, the shade of each cell represents the number of violent events falling within 80 varying spatial and temporal definitions of context (3-month breaks by incremental 10-km distance thresholds). The named survey locations on the vertical axis correspond to the map of the location (Figure 1). On the right-hand side of the figure, we plot the statistical intercepts for the preferred model using an example of a space-time dimension of 1 year and 50 km. Recreating the figure for every dimension (each column in the graphic) would generate similar variation for each.)

O’Loughlin and Witmer (2011, 2012) have mapped trends in violence (over time and space) in the North Caucasus using kernel density surfaces and conditional probabilities of reciprocal violence.

For our illustration, we analyze answers to five questions, each corresponding to one of our theoretical propositions. First, respondents are asked “How much pride do you have in your ethnic group?” We code respondents as proud if they reported “a lot.” Second, “There are people who are convinced that they could never forgive people of another nationality for violence they have committed in the last 15 years. Do you agree with them?” Respondents who replied “definitely agree” or “mostly agree” are coded as “unforgiving.” Third, to measure general trust, we asked “Would you say that most people can be trusted or that you need to be very careful in dealing with people?” Those who answered “you need to be careful” are understood to be untrusting. Fourth, we asked a question that is designed to better understand territoriality and views of geographic separatism. Respondents were told by the surveyors “Some people say that relations between peoples would be better if each had its own territory and other peoples left,” followed by the question “Do you agree with this belief?” Those who answered “strongly agree” or “agree” are coded as preferring separation. Fifth, the survey asked residents about their beliefs about the challenges in the region; “What of the following listed is the *most* serious danger facing the peoples of the North Caucasus in the next 5 years?” Presented also with crime, ethnic separatism, corruption, and lack of economic development and unemployment, a plurality of people (42%) responded that “terrorist actions and military conflicts” were the

TABLE 1. Descriptive Statistics of Survey Data Indicators—Key Outcomes and Predictors

	<i>Sum (Responded Affirmatively)</i>	<i>Maximum</i>	<i>Mean</i>	<i>SD</i>	<i>Min</i>
Separation best	281	1	0.140	0.348	0
No forgiveness	561	1	0.280	0.449	0
Ethnic pride	1147	1	0.574	0.495	0
Fear of war/terrorism	842	1	0.421	0.494	0
General trust	353	1	0.176	0.381	0
Poverty	883	1	0.442	0.497	0
Gender	922	1	0.461	0.499	0
Education	629	1	0.314	0.464	0
Rural	986	1	0.493	0.500	0

biggest problem. We code those individuals as fearful of violence. Descriptive statistics for all of the recoded survey data are shown in Table 1 above.

To control for alternative explanations of survey respondent attitudes, we include individual level controls for age, gender, rural versus urban location, and socioeconomic status. Because we investigate the details of how socioeconomic status affects opinions across a range of geographic scales in the second part of the results section below, the operational measure of this indicator deserves specific attention. Rather than relying upon a raw value to represent an individual's income, we use a question about household expenditures as a proxy for income. This measurement, used widely in post-Soviet surveys, is likely to capture a more comprehensive sense of relative well-being and socioeconomic status. Specifically, we code as "poor" those respondents who reported "we do not have enough money to provide food" or "we only have enough money to provide food." Our expectation is that the influence of poverty upon the answers to survey questions on attitudes in this region of conflict will change depending on the geographic-temporal definitions that we use to measure the context of violence.

#### *Survey Respondents in Their Respective Social Setting*

Because we are not using areal (administrative unit) data, we vary the spatial boundaries surrounding each of the 82 survey sampling point locations, resulting in a buffer that can be joined to the places where violent events occurred. Figure 1 maps all of the sampling points, identifying five of them on the vertical axis as we will use them as examples later in the paper (Oktyabrskoe, Prokhladny, Zavodskoi, Buinaksk, and Cherkessk). The five locations represent different republics and also variable levels of violence (some relatively peaceful, others extremely violent). We define temporal breaks for aggregating conflict at a unit of 3 months, ranging from 3 months to 2 years. In the spatial dimension, we use ten-kilometer breaks between 10 and 100.

Figure 2 confirms what we would expect about the violent event count when context is defined at different distances. In all cases, as the spatial buffer area expands (from 10 to 100 kilometers), a higher number of violent events take place within a respondent's social context. Temporally, a similar effect is evident as the duration of the window back from December 2005 increases. Much more violence is considered to have affected a person cumulatively over 2 years into the past than over the most recent 3 months. Five illustrative locations demonstrate different overall trends in violence. Zavodskoi (number 51) in South Ossetia (near Ingushetia) is quite violent, with conflict taking place across nearly all temporal and spatial dimensions (and with very high rates at coarse boundary definitions). In dramatic contrast, Oktyabrskoe (76), in northern Stavropol

territory is far from the core of violence in Chechnya and thus relatively peaceful. Cherkessk (40) represents a medium level of violence with no violence found at very fine temporal and spatial resolutions, but with accumulations as distances increase. From this graphical display, we make the straightforward conclusion that the context of violence (or the “violence neighborhood”) surrounding locations varies dramatically between locations and according to temporal threshold delimitation. The more important consideration relates to our earlier discussion of MAUP and the correct range for delimiting the context for each respondent remains unclear.

### *Statistical Models to Accommodate Spatial Variation*

Because we are interested in carefully incorporating spatial variation and differences in unique location experiences into our conclusions, we use a multilevel model allowing for a random intercept component of the estimated statistical fit for each of the 82 sample locations. This approach is related to that of the fixed effects method described above by allowing for variation due to unobservable influences but also gives us a coefficient estimate for the magnitude of the influence that a key characteristic of each sampling point (level of violence) has for the survey responses that we investigate.

The estimation can be represented as  $y_{ij} = \beta_{0j} + \beta_1 x_{1j} + \beta_2 x_{2ij} + \varepsilon_{ij}$ , with outcome  $y_{ij}$  for individual  $i$  living in sampling area  $j$  with  $i = \{1, 2 \dots 2,000\}$  and survey location  $j = \{1, 2 \dots 82\}$ . The model constant (Y intercept) is  $\beta_0$ . Coefficient estimate  $\beta_1$  represents the effect of the sampling enumeration area violent event count,  $x_{1j}$ . Individual level controls are captured in vector  $x_{2ij}$  with effects corresponding to  $\beta_2$ . Residual error is captured in  $\varepsilon_{ij}$ . As an example of the benefit of using our preferred model, we plot the intercepts (in term  $\beta_{0j}$  above) of a model of violence effects on the rate of survey respondent concerns about terrorism and war (further details below) to show dramatic variability for the association at the second (sampling point) level (see right-hand side of Figure 2). For the illustration, we selected a violence context metric of a dimension near the middle of the full range of months and kilometers (12 months and 50 km). Each of the five locations that we highlighted in the Figure 1 map is included in the intercept plot, and the differences between the five are apparent in addition to the differences between them. These relationships can be interpreted as clear evidence that the place where a respondent lives has a major bearing on what a respondent ranks as an important concern for everyday life, even after controlling for individual level influences such as age or education.

## **Results**

### *The Effects of Violence Upon Attitudes at Varying Space-Time Dimensions*

First, we present the coefficient estimate for the local violence indicator that quantifies its effect on respondents' beliefs. The shade of the cell in each figure reflects whether or not violent events have a large (dark) or small (light) effect on an opinion relative to all estimates for that model. In Panel A of each figure, we present the height of the coefficient estimate as the magnitude along the vertical axis relative to zero effect, which is illustrated in the black grid surface (representing odds ratio = 1). We use conventional levels of statistical significance to assign stars to each cell of Panel B, which illustrates whether the varying effect estimates are statistically significant. According to our research design, it is possible that violence across varying space-time dimensions has no statistically significant effect (Panel B), even though we display the trends in estimated



effects (Panel A). The effect may also be statistically significant for some space-time definitions of a survey respondent’s contextual area but not others, as is the case in Figure 3 below.

We show in Figure 3 that after controlling for individual respondent characteristics, violence in a local area increases the chances of reporting substantial pride in one’s own ethnic community; this result is in line with our expectations outlined earlier in proposition one. For the smallest spatial boundary definition (10 km), the relationship is not statistically distinct from zero effect at some temporal levels (for example, at 6, 9, and 12 months). It is worth noting that the effect of conflict can be characterized by a kind of distance decay function. Panel A indicates a consistent direction for the link between conflict and pride (it is always positive), but the magnitude of the relationship is dramatically smaller at the largest spatial dimension and temporal range (100 km and 24 months) than it is at some of the comparatively narrow spatial ranges and temporal thresholds (for example, 20 km and 3 months). Panel B confirms that this variation is statistically significant at nearly all space-time dimensions. We interpret this pattern as evidence that the effect of political violence upon ethnic pride is strongest when it is most immediate in a temporal sense and most localized in the geographic dimension. At the town or village level, conflict increases ethnic pride more substantially than violence at a broader regional level.

For the “unwillingness to forgive perpetrators of violence” measure, Figure 4 Panel A shows an interesting trend in the estimated conflict/attitude link, in which some dimensions exhibit positive associations and others a negative relationship. However, according to Panel B, the indicator is never statistically significant from zero effect, in contrast to our second proposition. Conducting the kind of comprehensive test that we have presented is extremely helpful for any interpretation of the results. The trend in the graphic should reassure readers that any claims about the presence of local violence and willingness to forgive are robust across a range of temporal-spatial values. In other words, a null find-

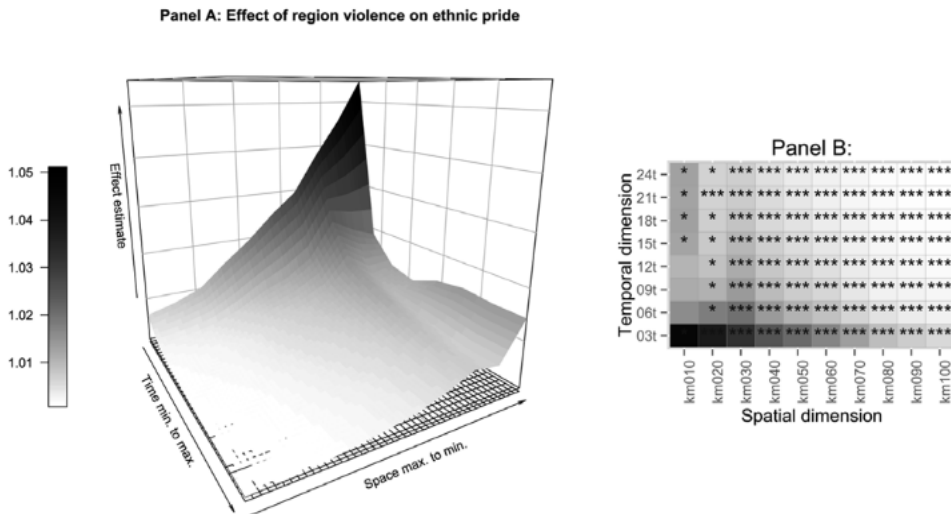


FIG 3. The Effects of Regional Violence on Ethnic Pride

(Notes. Coefficient estimates summarizing the effect that violent events have upon a survey respondent’s pride in their ethnic community. Bins/cells increase in spatial dimension by 10 km and in temporal dimension by 3-month period in both Panels A and B. Darker shades indicate a stronger effect. Panel A is rotated for ease of illustration and interpretation. In Panel A, zero effect (odds ratio of 1) is shown in the checkered surface. Panel B statistical significance levels: \*\*\* $p \leq .001$ ; \*\* $p \leq .01$ ; \* $p \leq .05$ .)

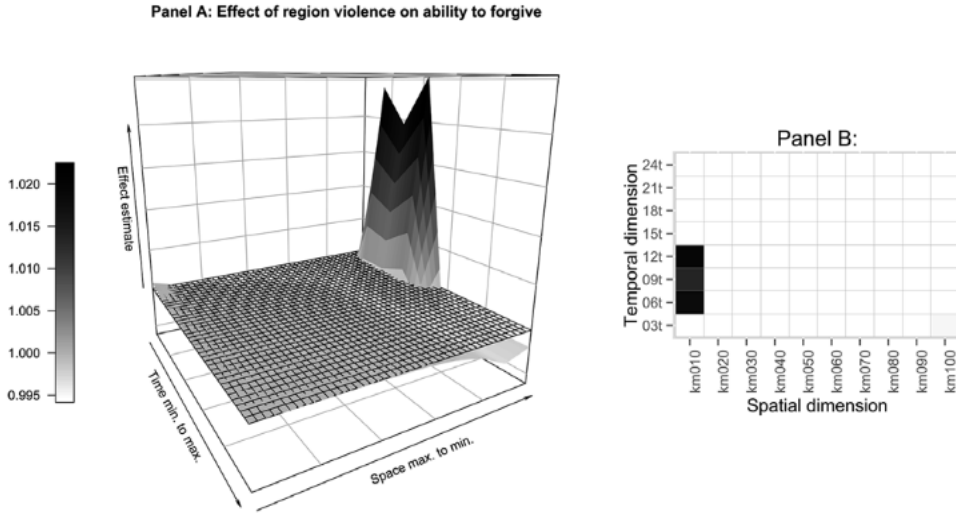


FIG 4. The Effects of Regional Violence on Willingness to Forgive Perpetrators

(Notes. Coefficient estimates summarizing the effect that violent events have upon a survey respondent's willingness to forgive perpetrators of violence. Bins/cells increase in spatial dimension by 10 km and in temporal dimension by 3-month period in both Panels A and B. Darker shades indicate a stronger effect. Panel A is rotated for ease of illustration and interpretation. In Panel A, zero effect (odds ratio of 1) is shown in the checkered surface. Panel B statistical significance levels: \*\*\* $p \leq .001$ ; \*\* $p \leq .01$ ; \* $p \leq .05$ .)

ing is not simply an artifact of using one set of thresholds; readers can be sure that from 10 km to 100 km, and from 3 months to 2 years previous, conflict does not affect the reported ability to forgive in the violent North Caucasus.

In Figure 5, where violence is used to predict the general levels of trust that each respondent reported, a more nuanced relationship emerges. The configuration of statistically significant effect estimates within the space-time graphic serves as a clear reminder that statistical results are indeed strongly influenced by geographical boundary definitions. Where the result is significant at conventional levels, we find support for our third proposition. When we use a large value of 40 or 50 km to aggregate conflict, a significant and substantial positive relationship between conflict and trust emerges. Violence within a respondent's surroundings has the effect of increasing the chances that he or she will declare that "you have to be careful" when dealing with strangers. We report our finding, however, with the caveat that when more distant or more proximate violence is considered, the significant positive effect disappears.

Perhaps the strongest case for careful consideration of our argument is found in Figure 6. The magnitude of a statistically significant coefficient estimate can change, as we have discovered for some responses above (for example, Figure 3). In such a case, the variation in estimates certainly calls for further inquiry into the relationship under investigation. Additionally, at some space-time ranges, the relationship may not be statistically significant (for example, Figure 5). This suggests a risk of reporting spurious associations—depending on the dimensions of the units of analysis; either a false positive, where aggregate violence nearby affects attitudes when it really does not, or a false negative, if violence is said to have no influence on attitudes when in fact it may. An even more worrisome scenario may occur when a different geographical definition of context, deployed for capturing social phenomena, leads to coefficient estimates that are both statistically significant and have opposing signs. Considering opinions about the territorial segregation of ethnic communities in the North Caucasus, violence near

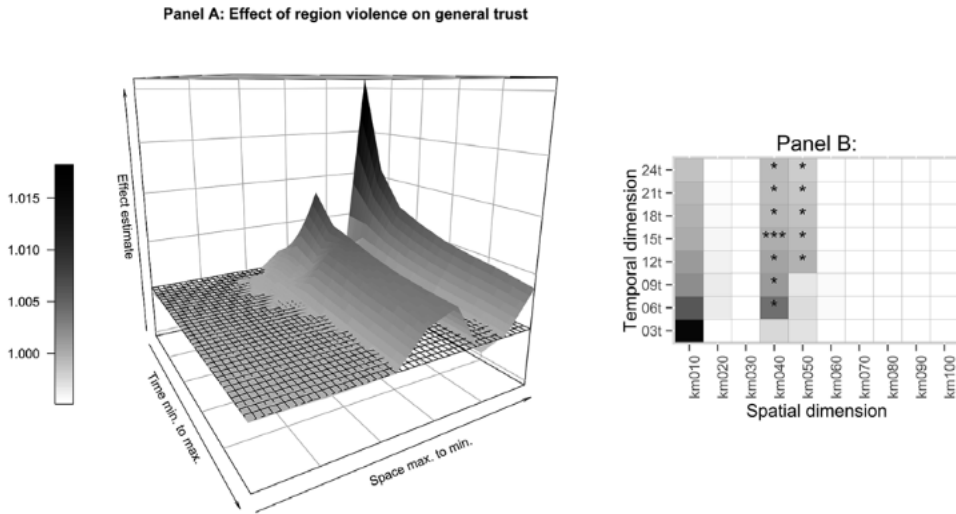


FIG 5. The Effects of Regional Violence on General Trust

(Notes. Coefficient estimates summarizing the effect that violent events have upon a survey respondent's reported general trust. Bins/cells increase in spatial dimension by 10 km and in temporal dimension by 3-month period in both Panels A and B. Darker shades indicate a stronger effect. Panel A is rotated for ease of illustration and interpretation. In Panel A, zero effect (odds ratio of 1) is shown in the checkered surface. Panel B statistical significance levels: \*\*\* $p \leq .001$ ; \*\* $p \leq .01$ ; \* $p \leq .05$ .)

a respondent can either increase the chances that he or she supports separation or decrease the odds of holding such an opinion. The difference, as Figure 6 illustrates, hinges on whether violence is considered to be taking place “nearby” at a distance of 10 km or at 50 km (or more) away from the sampling point. In Panel A, the odds ratio surface is clearly sometimes above and at other times below the indicator for zero effect. Panel B confirms that both high (dark) and low (light) estimates are statistically significant in certain space-time combinations. Mixed evidence for our fourth proposition is a function of the dimensions of violence aggregation.

The impact of contextual-level violence upon the fear of terrorism matches our expectation stated in proposition five. Nevertheless, and as is the case for some other indicators above, the association is only reliable in roughly 10% of the 80 space-time configurations in Figure 7. The most consistent result for a spatial dimension is found at 30 km, for example, and no relationship is evident for smaller boundaries (10 or 20 km) or larger definitions (40, 50, or 60 km). From our analysis of these varying effects that political violence can have upon opinions, we conclude that the nuances of social settings for conflict research are influenced by definitions of time and space.

#### *Varied Links Between Poverty and Opinion According to Violence Aggregation Rules*

In addition to showing that different combinations of spatial and temporal dimensions result in varying estimates of how conflict affects key attitudes, we illustrate that this variation in definitions of context can also affect the conclusions that are reached for *other* indicators/variables in explanatory models. This is reflected in modified proposition 4b above. As an example, we investigate the details of how poverty affects preferences for territorial separation of different ethnicities in the North Caucasus region. Poorer populations have shown less



Panel A: Effect of region violence on preference for ethnic segregation

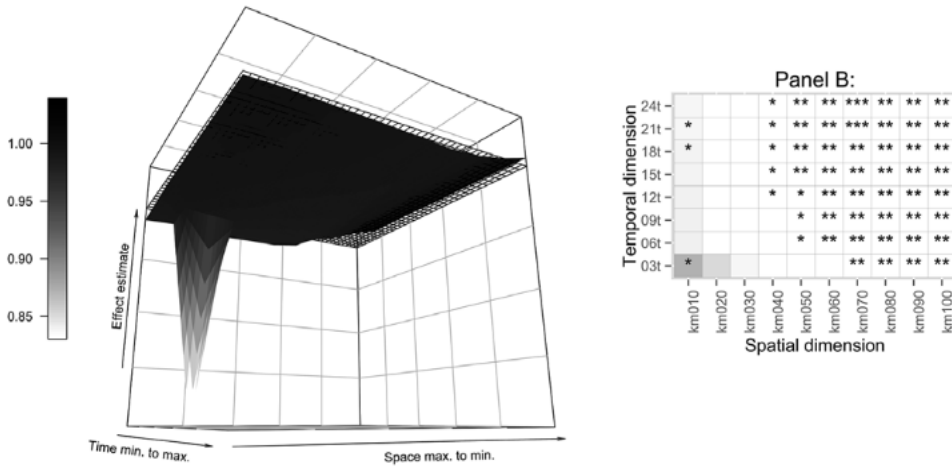


FIG. 6. The Effects of Regional Violence on Preference for Ethnic Segregation

(Notes. Coefficient estimates summarizing the effect that violent events have upon a survey respondent's views about the territorial separation of ethnic communities. Bins/cells increase in spatial dimension by 10 km and in temporal dimension by 3-month period in both Panels A and B. Darker shades indicate a stronger effect. Panel A is rotated for ease of illustration and interpretation. In Panel A, zero effect (odds ratio of 1) is shown in the checkered surface. Panel B statistical significance levels: \*\*\* $p \leq .001$ ; \*\* $p \leq .01$ ; \* $p \leq .05$ .)

willingness to reconcile with former enemies and more preference to live in ethnic enclaves, as is evident in Bosnia-Herzegovina (O'Loughlin 2010). Do poorer populations in the North Caucasus express similar sentiments, and do these preferences vary according to the size of the space-time context cylinder? Even with a question that is not directly related to a conflict research agenda, it would be wise, given the sensitivity of the matter, to control for the influences that violent experiences have on personal opinions. In striving to understand this question, we found that the boundaries of place for conflict aggregations can change the results of quantitative analyses *even when they are incorporated into models as a control variable*, rather than as the indicator of primary interest, the case for our earlier analyses. In examining this possibility, we vary the spatial and temporal boundaries for violent event aggregations in the same manner as the figures above. However, the reported coefficient estimate and significance level in this case is that for our socioeconomic status proxy (SES), the ability to afford goods. We define poor as the "ability to afford only food" or "the inability to afford food." This index is a standard proxy for material well-being in the former Soviet Union and considers that respondents have more than a cash income, have unreported incomes, and are leery of providing information about specific income sources and amounts.

Poorer residents of the North Caucasus are more likely to approve of territorial separation than their wealthier peers, in line with earlier reported findings for Bosnia-Herzegovina. Overall, the coefficient estimates for our low-income proxy are positive across all space-time dimensions used to aggregate violent events (Figure 8). However, this relationship between SES and preferences for territorial separation is *only* statistically significant when controlling for conflict that has taken place at relatively large distances. Controlling for conflict within 10, 20, 30, etc. kilometers results in a null finding, which varies substantially

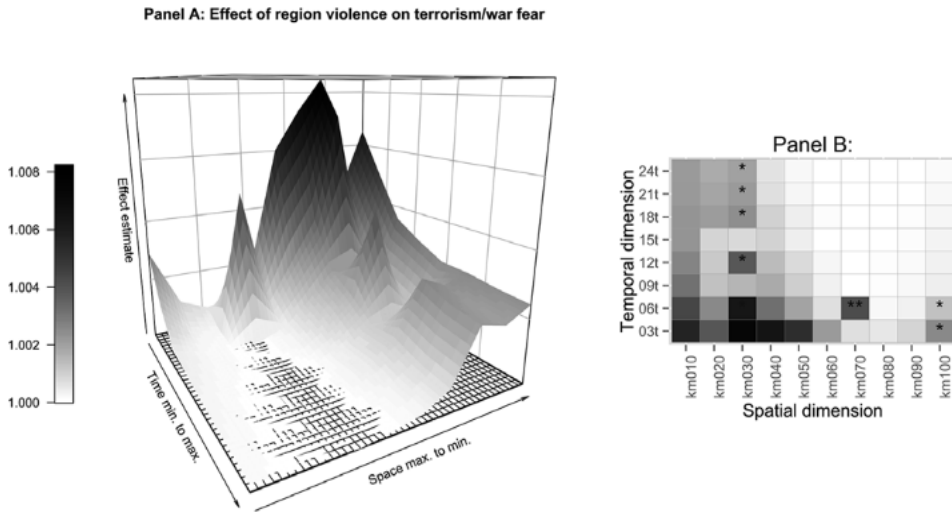


FIG. 7. The Effects of Regional Violence on Fear of Terrorism/War

(Notes. Coefficient estimates summarizing the effect that violent events have upon a survey respondent's fear of terrorism and armed conflict. Bins/cells increase in spatial dimension by 10 km and in temporal dimension by 3-month period in both Panels A and B. Darker shades indicate a stronger effect. Panel A is rotated for ease of illustration and interpretation. In Panel A, zero effect (odds ratio of 1) is shown in the checked surface. Panel B statistical significance levels: \*\*\* $p \leq .001$ ; \*\* $p \leq .01$ ; \* $p \leq .05$ .)

from the conclusion a scholar would reach using a boundary definition of 100 km. The effect of local violence on the poverty-ethnic separation preference is therefore not evident in the immediate vicinity of the respondent's residence, but seems to be connected to the regional character as a whole since a range of 100 kilometers covers large portions of the study region for most of the survey locations.

## Conclusion

Spatial analysis of conflict processes in the field of international studies must wholeheartedly embrace a nuanced approach to understanding contexts, places, and social settings of human behavior. For Russia's North Caucasus, we find that occurrences of local violence have influenced sentiments among the population living in the region (with the exception of willingness to forgive those who perpetrated such violence). Violence is associated with lack of trust and a preference for ethno-territorial separation, findings that both contribute substantially to our understanding of the effects of war and the outcomes of experiences of conflict for victims. Importantly, however, we have illustrated that the effects of violence are not consistent across definitions of a respondent's context. For example, while violence correlates with preference for separation, such a relationship only exists for violence *in proximity to respondents* and not for violence taking place at greater distances, in which case people disapprove of separation. Even when the overall direction of a statistical association between violent events and attitudes points in a consistent direction at ranges from 10 km and 3 months out to 100 km and 24 months, there is nevertheless a notable variation in the magnitude of that influence.

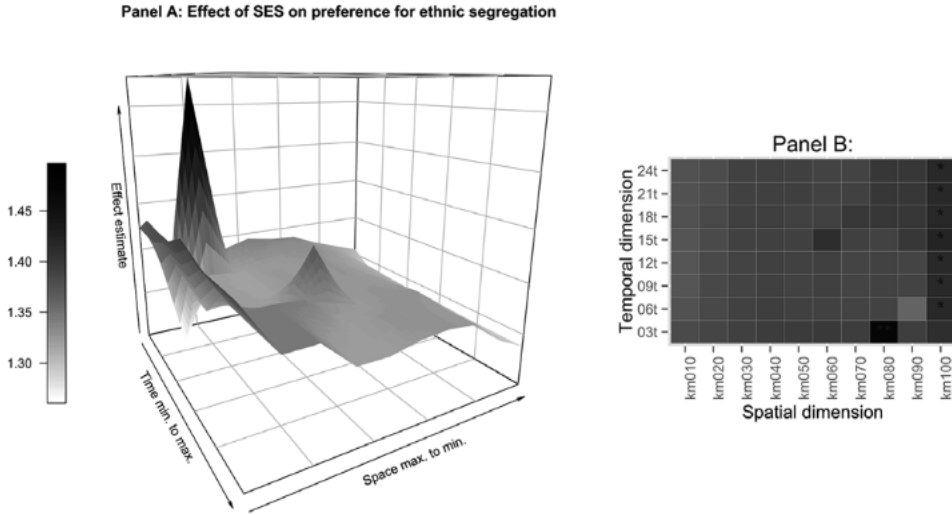


FIG 8. The Effects of Socioeconomic Status (SES) on Preferences for Ethnic Segregation

(Notes. Coefficient estimates summarizing the effect that poverty has upon a survey respondent's belief that territorial separation among groups is preferable to integration. Bins/cells increase in spatial dimension by 10 km and in temporal dimension by 3-month period in both Panels A and B. Darker shades indicate a stronger effect. Panel A is rotated for ease of illustration and interpretation. The checkered black surface representing zero effect (odds ratio of 1) is below the axis of the graph (these estimates are greater in magnitude than those plotted in other figures above). Panel B statistical significance levels: \*\*\* $p \leq .001$ ; \*\* $p \leq .01$ ; \* $p \leq .05$ .)

Rarely in conflict studies research (exceptions were noted earlier) have the space-time dimensions of definitions for regions been allowed to vary in a manner that would capture the nuances we have identified above. Allowing data to “speak for themselves” should not apply solely to exploratory forays that researchers make into the data that they have collected. A more generally inductive style of research design—in contrast to the more common, deductive, hypothesis-testing approach that dominates quantitative international studies—is warranted. In conclusion, we stress that the variations in the results shown above should not be considered a technical annoyance; to the extent that we can capture social processes by observing and cataloging them, this is what the ties between violence and opinion in Russia's violent North Caucasus look like. Carefully identifying these inconsistent effects is key to understanding how the social qualities of places and the people living in them interact.

## References

- AGNEW, JOHN. (1987) *Place and Politics: The Geographical Mediation of State and Society*. London: Allen and Unwin.
- AGNEW, JOHN. (1996) Mapping Politics: How Context Counts in Electoral Geography. *Political Geography* 15: 129–146.
- ANGRIST, JOSHUA D., AND JÖRN-STEFFEN PISCHKE. (2009) *Mostly Harmless Econometrics: An Empiricist Companion*. Princeton, NJ: Princeton University Press.
- BAKKE, KRISTIN, JOHN O'LOUGHLIN, AND MICHAEL D. WARD. (2009) Reconciliation in Conflict-Affected Societies: Multilevel Modeling of Individual and Contextual Factors in the North Caucasus of Russia. *Annals of the Association of American Geographers* 99 (5): 1012–1021.
- BALCELSS, LAIA. (2012) The Consequences of Victimization on Political Identities: Evidence from Spain. *Politics and Society* 40 (3): 311–347.



- BASEDAU, MATTHIAS, AND JAN HENRYK PIERSKALLA. (2013) How Ethnicity Conditions the Effect of Oil and Gas on Civil Conflict: A Spatial Analysis of Africa from 1990 to 2010. *Political Geography* 38: 1–11.
- BAYBACK, BRADY, AND ROBERT HUCKFELDT. (2002) Urban Contexts, Spatially Dispersed Networks, and the Diffusion of Political Information. *Political Geography* 21 (2): 195–220.
- BLAIR, GRAEME, CHRISTINE C. FAIR, NEIL MALHOTRA, AND JACOB N. SHAPIRO. (2013) Poverty and Support for Militant Politics: Survey Evidence from Pakistan. *American Journal of Political Science* 57 (1): 30–48.
- BRAITHWAITE, ALEX, AND SHANE D. JOHNSON. (2012) Space-Time Modeling of Insurgency and Counterinsurgency in Iraq. *Journal of Quantitative Criminology* 28 (1): 31–48.
- BUHAUG, HALVARD, AND JAN KETIL RØD. (2006) Local Determinants of Africa Civil Wars, 1970–2001. *Political Geography* 25 (3): 315–335.
- BUHAUG, HALVARD, KRISTIAN SKREDE GLEDITSCH, HELGE HOLTERMANN, GUDRUN ØSTBY, AND ANDREAS FORØ TOLLEFSON. (2011) It's the Local Economy, Stupid! Geographic Wealth Dispersion and Conflict Outbreak Location. *Journal of Conflict Resolution* 55 (5): 814–840.
- DYRSTAD, KARIN. (2012) After Ethnic Civil War: Ethno-Nationalism in the Western Balkans. *Journal of Peace Research* 49 (6): 817–831.
- ENOS, RYAN D. (2014) Causal Effect of Intergroup Contact on Exclusionary Attitudes. *Proceedings of the National Academy of Sciences of the United States of America* 111 (10): 3699–3704.
- FEARON, JAMES D., AND DAVID D. LATTIN. (2003) Ethnicity, Insurgency, and Civil War. *American Political Science Review* 97 (1): 75–90.
- GEHLKE, CHARLES E., AND KATHERINE BIEHL. (1934) Certain Effects of Grouping Upon the Size of the Correlation Coefficient Census Tract Material. *Journal of the American Statistical Association* 29 (185): 169–170.
- GIMPEL, JAMES, AND JASON E. SCHUKNECHT. (2003) Political Participation and the Accessibility of the Ballot Box. *Political Geography* 22 (5): 471–488.
- GOULD, PETER. (1970) Is Statistix Inferens the Geographical Name for a Wild Goose? *Economic Geography* 46 (Special issue): 439–448.
- HEGRE, HAVARD, GUDRUN ØSTBY, AND CLIONADH RALEIGH. (2009) Poverty and Civil War Events: A Disaggregated Study of Liberia. *Journal of Conflict Resolution* 53 (4): 598–623.
- KING, GARY. (1996) Why Context Should Not Count. *Political Geography* 15 (2): 159–164.
- LEVI, MARGARET, AND LAURA STOKER. (2000) Trust and Trustworthiness. *Annual Review of Political Science* 3 (1): 475–507.
- LINKE, ANDREW M. (2013) The Aftermath of an Election Crisis: Kenyan Attitudes and the Influences of Individual-Level and Locality Violence. *Political Geography* 37: 5–17.
- LINKE, ANDREW M., AND JOHN O'LOUGHLIN. (2015) Spatial Analysis. In *A Companion to Political Geography*, 2nd Edition, edited by John Agnew, Virginie Mamadouh, Anna Secor, and Joanne Sharp. Oxford: Wiley-Blackwell.
- LINKE, ANDREW M., FRANK WITMER, AND JOHN O'LOUGHLIN. (2012) Space-Time Granger Analysis of the War in Iraq: A Study of Coalition and Insurgent Action-Reaction. *International Interactions* 38 (4): 402–425.
- MCDOOM, OMAR SHAHABOUDIN. (2014) Predicting Violence within Genocide: A Model of Elite Competition and Ethnic Segregation from Rwanda. *Political Geography* 42: 34–45.
- MONTALVO, JOSE G., AND MARTA REYNAL-QUEROL. (2005) Ethnic Polarization, Potential Conflict, and Civil Wars. *American Economic Review* 95 (3): 796–816.
- O'LOUGHLIN, JOHN. (2010) Inter-Ethnic Friendships in Postwar Bosnia-Herzegovina: Socio-Demographic and Place Influences. *Ethnicities* 9: 26–54.
- O'LOUGHLIN, JOHN, AND FRANK WITMER. (2011) The Localized Geographies of Violence in the North Caucasus of Russia, 1999–2007. *Annals of the Association of American Geographers* 101 (1): 178–201.
- O'LOUGHLIN, JOHN, AND FRANK WITMER. (2012) The Diffusion of Conflicts in the North Caucasus of Russia, 1999–2010. *Environment and Planning A* 44 (10): 2379–2396.
- O'LOUGHLIN, JOHN, EDWARD HOLLAND, AND FRANK WITMER. (2011) The Changing Geography of Violence in the North Caucasus of Russia, 1999–2011: Regional Trends and Local Dynamics in Dagestan, Ingushetia and Kabardino-Balkaria. *Eurasian Geography and Economics* 52 (5): 596–630.
- OPENSHAW, STANLEY. (1983) *The Modifiable Areal Unit Problem*. Norfolk: Geo Books.
- OPENSHAW, STANLEY. (1996) Developing GIS-Relevant Zone-Based Spatial Analysis Methods. In *Spatial Analysis: Modeling in a GIS Environment*, edited by Paul Longley and Michael Batty. New York: John Wiley.

- OPENSHAW, STANLEY, AND PETER TAYLOR. (1979) A Million or So Correlation Coefficients: Three Experiments on the Modifiable Areal Unit Problem. In *Statistical Applications in the Spatial Sciences*, edited by Neil Wrigley. London: Pion.
- PATTIE, CHARLES, AND RONALD J. JOHNSTON. (2000) "People Who Talk Together Vote Together": An Exploration of Contextual Effects in Great Britain. *Annals of the Association of American Geographers* 90 (1): 41–66.
- PRED, ALAN. (1983) Structuration and Place: On the Becoming of Sense and Place and Structure of Feeling. *Journal for the Theory of Social Behavior* 13 (1): 45–68.
- RALEIGH, CLIONADH, AND HAVARD HEGRE. (2009) Population Size, Concentration, and Civil War: A Geographically Disaggregated Analysis. *Political Geography* 28 (4): 224–238.
- ROBINSON, WILLIAM S. (1950) Ecological Correlations and the Behavior of Individuals. *American Sociological Review* 15 (3): 351–357.
- ROOT, ELISABETH D., ROBERT MEYER, AND MICHAEL EMCH. (2009) Evidence of Localized Clustering of Gastroschisis in North Carolina, 1999–2004. *Social Science and Medicine* 68 (8): 1361–1367.
- RUSTAD, SIRI CAMILLA AAS, HALVARD BUHAUG, ÅSHILD FALCH, AND SCOTT GATES. (2011) All Conflict is Local: Modeling Subnational Variation in Civil Conflict Risk. *Conflict Management and Peace Science* 28 (1): 15–40.
- SCHUTTE, SEBASTIAN, AND KARSTEN DONNAY. (2014) Matched Wake Analysis: Finding Causal Relationships in Spatiotemporal Event Data. *Political Geography* 41: 1–10.
- SELVIN, HANAN C. (1958) Durkheim's Suicide and Problems of Empirical Research. *American Journal of Sociology* 63 (6): 607–619.
- SPIELMAN, SETH E., EUN-HYE YOO, AND CRYSTAL LINKLETTER. (2013) Neighborhood Contexts, Health, and Behavior: Understanding the Role of Scale and Residential Sorting. *Environment and Planning B* 40 (3): 489–506.
- SPROUT, HAROLD, AND MARGARET SPROUT. (1965) *The Ecological Perspective on Human Affairs: With Special Reference to International Politics*. Princeton, NJ: Princeton University Press.
- VIDAL DE LA BLANCHE, PAUL. (1903) *Tableau de la Géographie de la France*. Paris: Hachette (reprinted: Paris, Tallandier, 1979).
- ZHUKOV, YURI M., AND BRANDON M. STEWART. (2013) Choosing Your Neighbors: Networks of Diffusion in International Relations. *International Studies Quarterly* 57 (2): 271–287.