Lynched in the Name of the Cow

An epidemiological appraisal of Cow-related Violence in India

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Abstract

This paper sheds light on the recent spike in communal violence in India by theorizing *unorganized violence as an epidemic*. The basic premise is that riots, lynching, xenophobic assaults, and forms of *spontaneous* and *uncoordinated* violence spread rapidly when states fail to *contain* the initial violent events. Poor quarantine i.e. inadequate state response catalyzes the outbreak among the observers with variable *predisposition* to violence. Some of them are more *vulnerable* than others due to a combination of several unit-specific and system-specific factors. Each event generates a pathogenic *template of action* i.e. *heuristic* containing information about the event and the ensuing sanctions. Lower probability of sanctions increases the likelihood of violence. Repetitive exposure to violent events cements the template in the minds of the observers, and the heuristic is involuntarily activated when they find themselves in a situation they had vicarious observed. I use a novel dataset on cow-related violence in India to show that a violent heuristic around a common object of contention spreads like an epidemic in the absence of satisfactory police response. I also identify other cases where this analogy can be applied to increase our understanding of how violence spreads.

Pehlu Khan was lynched in the name of the Cow on April 2017 in front of his sons. They were returning to their home with cows they had purchased from a cattle fair when a group of cow vigilantes stopped them on a busy highway. Vigilantes started beating them with sticks as soon as they realized Khan and his companions were Muslim. Khan showed them the permit to prove he was bough cows for milk, but the vigilantes did not listen. They assumed he was taking cow for slaughter. Police, a mile away from the incident, arrived hours late and registered a case against the vigilantes with a further delay of 9 hours [CJP, 2017]. Khan sustained fatal injuries and died two days later in a hospital. The perpetrators were acquitted two years later because police could not present a satisfactory case against them [Sharma, 2019].

Pehlu Khan case became the quintessential exemplar of the recent spike in cow-related violence in India and left behind a trail of questions to be answered. *Why did the mob resort to violence? Why did unorganized cow-related violence spike over the last few years?* This paper is an initial attempt to synthesize an epidemiological explanation of violence based on a premise that violence spreads like an epidemic in the absence of adequate state response. Each violent event generates templates of action containing information on the incident and the ensuing sanctions associated with it. Violence spreads when these templates are employed as heuristics in similar situation by random observers. This theory can be applied to various forms of political action including unorganized and spontaneous protests, riots, and anti-government violence, where decisions of potential participants depend on the actions of their peers and the consequences of these actions.

I start with an assumptions that unorganized violence is ubiquitous among fragmented societies. It erupts randomly, but is often contained through adequate state response. However, such violence grows into an epidemic when state does little to contain it. There comes a point when violence surpasses the tipping point and becomes a self-propagating phenomenon just like an epidemic. I show using a novel dataset from India that cow-related violence grew from sporadic acts of low-intensity violence to an epidemic of national scale. My analysis suggests that an adequate police response is a strong predictor

of future violent events. I also find that violence spreads through exposure to previous violent events, or due to the availability of violent templates of action according to my theory.

The paper proceeds as follows. First, I discuss literature employing epidemiological metaphors and relate them to my theory. Second, I discuss the ecological factors predisposing some units to violence more than others. Third, I describe a research design to test the implications of my proposition. Finally, I outline the results of my analysis and discuss its implications.

1. Epidemic as a *metaphor* and *Unorganized Violence*

Since [Alcock, 1972] described violence as *disease* [1], many scholars have employed the epidemiological metaphors to explain the dynamics of protests [Andrews and Biggs, 2006], racial riots [Myers, 1997], civil war [Braithwaite, 2010] and last but not the least xenophobic violence in Germany [Braun and Koopmans, 2009] and the Netherlands [Braun, 2011]. This usage is justified through the observation that violence engulfs polities and societies swiftly −*violence, once starts, spreads.* An emerging research agenda thus urges political scientists to think like epidemiologists to identify parallels between disease and violence to preempt and mitigate it.[2]

Epidemiologists categorizes diseases as *endemic* or *epidemic* based on their occurrence in a given geography or population. A disease is endemic if its occurrence is constant or in line with its expected or *baseline* rate, whereas a disease is epidemic if its occurrence clearly exceeds the *baseline* expectancy [Porta, 2014]. Following this definition, the underlying probability of an endemic is stable and function of certain parameters of the population, while the probability of an epidemic is unstable and a function of *mass action principle*[3] – the number of unobserved or future cases is a function of observed

[1] To be precise, he use the term disease for war, which is organized violence a large scale.

[2] *"... their [the epidemiologists'] job is to find out how we can avoid illness and postpone death. Our job, in trying to understand international relations, is to find out how to prevent or mitigate violent conflict."* [Oneal and Russett, 2001] cited in [Braithwaite, 2010].

[3] Mass action principle can be understood as Markovian process. See: [Ibe, 2013].

or infected cases as well as the number of units predisposed to the disease within the given population [Porta, 2014]. The term "epidemic" then can be use to *metaphorically* to describe a phenomenon (social, political, economic) that (1) manifest themselves at an unusually frequent rate than the baseline, and (2) diffuse rapidly among a geography or population in short time.

Spontaneous and *unorganized* forms of violence are more likely to mimic epidemics than other forms because (1) such events involve *behavioral emulation based on second-hand information* [Pitcher et al., 1978], and (2) they spread like wildfire in the absence of an adequate state response. Unorganized forms of violence, described as *low-intensity violence* [Balcells et al., 2016] or *local violence* [Autesserre, 2010], include but are not limited to riots, vigilantism, lynching, mob violence, arson, vandalism, and xenophobic attacks. These forms of violence are more frequent and lethal than the organized ones like terrorism or civil wars [Blair et al., 2017]. That said, unorganized violence is omnipresent in our societies and only becomes a issue when it exceeds the baseline. This suggests that (1) diagnosis of an epidemic process is retrospective and (2) dependent on some baseline expectation.

The element of *spontaneity* in unorganized violence suggests that actors participate in random violent events without much deliberation or long-term incentives. Their decisions to participate in a violent event is influenced by their *exposure* to violence in the past. The previous violent events provide *templates of action* to the observers providing them information about the object of contention, the nature of action, and its consequences. However, observers differ in how they interpret the message. Some observers are more likely to receive the message and engage in violence because their personal experience and political context predisposes them to act. Others deliberate over and wait for further information. It is also likely that a significant proportion of the society refrains from violence.

The dynamics of unorganized violence can be illustrated further by analyzing cow-related violence through as an epidemiological perspective.

3 Cow-related Violence as an Epidemic

Cow-related violence is not an novelty in India. Cow is a sacred animal for Hindus symbolizing motherhood and fertility. Cow slaughtered has been banned in many Indian states for this reason.[4] However, Muslims who make a significant minority in India hold a different perspective − they slaughter cows! Not only Muslims, but also Dalits or the so-called untouchables dwell on cows. They are involved in leather tanning and garbage disposal business where they often have to deal with the animal. Previous studies show a regular contention over cow throughout the history of modern India [Wilkinson, 2006, Brass, 1997]. However, this violence was sporadic and contained until it spread throughout India like an epidemic after 2014. Journalistic reports suggest 97% cow-related violent events in recent Indian history (since 2010) happened after 2014 [HindustanTimes, 2017]. 69% of these incidents in the most populous state, Uttar Pradesh, happened after 2017 [TheQuint, 2018]. This observation relates to the question I asked in the beginning: Why did the episodes of cow-related violence spike over the last few years?

To explain this phenomenon, I start with few assumptions. (i) There exists some baseline level of hostility among Indians − especially Hindus and Muslims. (ii) Cows are an obvious object of contention because Muslims eat it and Hindus worship it. (iii) Political context predispose some individuals to violence more than others. (iv) A random violent event feeds that hostility pushing the society at the edge of violence. These assumptions are in parallel with the underlying mechanisms of a natural epidemic. Disease spreads through exposure. It may be (1) *proximity* to an event or instigator, (2) the *degree* (or amount) to which an emulator observers or interacts with a phenomenon, and (3) *process* that involves information processing and subjective decision making that influences the probability of violence in the future [Porta, 2014]. Violence spreads in a similar fashion. Exposure to violent models increases violent behavior among observers especially when

[4]See appendix for variation in cow-related legal provisions among Indian states.

the model is from their own kind [Bandura et al., 1961].[5] Groups also emulate violent tactics of their peers facing similar challenges [Forsberg, 2014, Fox, 2004]. Repetitive exposure to violence (reinforcement) increases the tendency to exhibit violent behavior in daily interaction [Huesmann, 2012, Bandura, 1973]. These apparent parallels between epidemics and violence are a useful tool for explaining how the later spreads.

Societies are composed of members with variable resistance against a pathogen. Some individuals are more vulnerable than others because they are exposed to some predisposing ecological factors. When a random individual develops an infection, he increases the risk of infection among others especially those in close proximity. The risk of infection increases exponentially with each new infected individual. This mechanism can be related to violent incidents increase likelihood of future violence. A random violent event increase the risk of violence to some degree that doubles when another random or related violent event occurs. Just as the number of infected individuals increase the risk of infection, the number of violent events increase the risk of violence among the rest of the population.

Data on cow-related violent events lends some face-validity to this claim. Cow-related incidents increased from 5 in 2014 to 19 in 2015, 42 in 2016, and 45 in 2017. It went down after that to 37 in 2018 and 10 in first 5 months of 2019. The spike be attributed to two interlinked factors. (1) The inability of the state to contain it i.e. inadequate state response or failure of police to apprehend the responsible individuals. (2) The ensuing proliferation of cow-related violent event based on decisions made through observing minimum sanctions in the past. The basic premise here is that each event generate a set of externalities − or *templates of action.* These templates operate as *heuristic* for the predisposed observers. When they come across a situation that had directly or vicariously observed, this heuristic is involuntarily triggered, which explains the spontaneous and situational nature of cow-related violence.

How does this heuristic develops? It develops through prolonged and repetitive exposure to violent events that reduce cognitive dissonance associated with violence. Cognitive

[5]Observers were more likely to emulate aggressive behavior of a model from same sex in this study.

dissonance theory suggests that individuals experience mental discomfort taking actions conflicting with the prevalent norms [Festinger et al., 1952]. Propensity to violence varies from person to person depending on the level of dissonance they experience. This means some are hardwired to resist violence more than others. This resistance is similar to their ability to resist the onslaught of a disease. The likelihood that a relatively resistant individual becomes infected depends not only on the strength of the pathogen but also on the magnitude of the exposure. The cumulative probability of infection increases each time the subject comes in contact with the pathogen. A strong heuristic develops in a similar fashion. The more an individual is exposed to violent event, the more accustomed he feels to otherwise disturbing phenomenon. Repetition desensitizes onlookers to violence [Mrug et al., 2016]. An otherwise extraordinary events becomes ordinary through repetition. Each violent event strengthens the heuristic − the template of action, and affects the probability of future violence.

What *spreads* in a violent epidemic is the *template of action* associated with a situation or an *object of contention*. This template or heuristic prepares observers to violence in a similar situation. If a pathogen makes people sick then by same logic these frames made people violent. A qualitative appraisal of the cow-related violence suggests that events became lethal over time. Deaths in cow-related violence went from zero in 2014 to 6 in 2015, 8 in 2016, 15 in 2017, and 12 in 2018 when the police started apprehending the perpetrators. Arrests proportional to the number of events went down from 20% in 2015 to 19% in 2016 to a startling 7% in 2017, and then spiked up to 28% in 2018 (see appendix). The spread of violence was arguably due to a lack of failure on the behalf of the state to contain it and highly violent template infected people through repetitive exposure. If cow-related violence spread through India like a diseases then we can test this mechanism through the following proposition:

Hypothesis 1: *The likelihood of future violence increases with exposure to previous violent events.*

Shared characteristics are as crucial to the spread of violence as they are to a disease. Similarity is a function of geography in a country as diverse as India where ethnicity and culture changes every hundred miles. Proximate units influence each other because they share similar characteristics and opportunities. Geographical *proximity* increases the likelihood of a violent because *trigger factors* are concentrated in space [O'Loughlin and Anselin, 1992, Buhaug and Gleditsch, 2008]. It makes further sense when we consider permissive political conditions or *opportunity structures* in the same geographic unit. Literature suggests certain forms of collective action manifest itself when political opportunities for mobilization are available [Tarrow, 2011, Kriesi et al., 2004]. Opportunities then refer to possibilities, constraints, and threats exogenous to the mobilizing group, which affect its size and ultimately determine the degree to which group realizes its collective interests [Tarrow, 1996]. How polarized are the opposing groups? How impartial is the government? How responsive is the police? How big is the threat of retaliation? are some of the factors that determine the likelihood of violence. Information on these variable is local or unit-specific.

We can derive from there that the likelihood of a violent outbreak is dependent on unit-specific and system-specific conditions that make some localities more prone to violence than other and some periods more violent violent than others. It is appropriate to think predisposition or vulnerability as challenges or reasons that pushes some units among the population or geography to the edge of violence. It may erupt along the lines of the makeup and salience ethnicities in the unit [Blumer, 1958, Horowitz, 2000], the availability and distribution of resources [Sherif, 1966, Gurr, 1968], and history of hostility among the occupants of the unit [Brass, 1997] among other reasons. Similarly, violence can also be influenced by conditions exogenous to the unit. It may be caused by a number of system-wide variables including but not limited to economic crisis [Chassang and Padro-i Miquel, 2009], regime change [Gledhill, 2012], institutional realignment [Christensen et al., 2019], and climate shocks [Theisen et al., 2013]. A com-

bination of the unit-specific and system-specific conditions makes an outbreak more likely.

Observers sharing similar demographic characteristics and political conditions are more likely to follow the footsteps of their peers because "they have similar information, have similar information, face similar action alternatives, and face similar payoffs. As a result, they make similar choices" [Bikhchandani et al., 1992]. Initial events, regardless of whether they are intentional, emulative or accidental, increase the propensity of violence by providing strong templates to the rest of the population facing similar challenges. It is then appropriate to assume geographical proximity if predisposing factors are clustered in space and random violent event serve as a heuristic to the observers close by − say in the next village − who are as angry over the mistreatment of cows as their fellows in the village where first violence event occurs.

Hypothesis 2: *The likelihood of future violence increases in the close vicinity of the previous events.*

4. Data & Method

Some studies have tried to explore the long-term trends and causes of unorganized collective violence (see: [Wilkinson, 2006, Brass, 1997, Brass, 2011, Varshney, 2006]), but the resurgence of communal violence since 2014 remains an unexplored territory. Among other forms of collective violence, a systematic attempt to collect long-term data on cow-related violence has yet to be made. Indian Ministry of Home Affairs does not collect data on communal violence [HindustanTimes, 2017]. Two recent attempts to document such events (and communal violence) in general have faced significant uproar and were forced to take down their catalogue of incidents [Vijayan, 2017]. Cow related violence is subsumed under other forms of collective violence in remaining online databases (like [HRW, 2019]). Th problem is that most of these databases started recorded cow-related violent events in late 2015 − by then cow-related violence had already taken an epidemic path.

I undertook the task of unifying reports on this particular form of collective violence because of the following reason. (1) The object of contention is *objective* i.e. isolating cow-related incidents among a constellation of other events allows isolation of the cause of violence. (2) Most of these events are *localized* and *unorganized*. It starts with mis-treatment (usually slaughtering) of cows that spontaneous developed into a mob violence event. The perpetrators were often locals who join the crowd without investigating the cause (which occasionally is something else like personal vendetta). The argument here is that people act on the basis of templates of action they observe elsewhere and the situational they find themselves activates their reaction. (3) Cow-related events tend to cluster in space suggesting a proximity effect that can either be interpreted as an outcome of geographically clustered trigger factors and political opportunities. (4) These sporadic events became more frequent and extreme since 2014 following an epidemic pattern.

The data consists of events between 16 May 2014 to 26 May 2019, which is interim period between two national elections (2014 and 2019). This choice is deliberately made for two reasons: (1) to treat Bharatiya Janata Party's government in the center as a

constant, and (2) most online newspaper archives seldom extend beyond beyond 2014. I used keywords associated with cow-related violence[6] to pull information from the websites of *Hindustan Times*, *The Hindu*, *Times of India*, *The Wire*, and *Indian Express*. Only the stories stating physical use of violence against persons or property are coded. There are total 157 events in my dataset. There are obviously more incidents, but most of them are localized and seldom get reported in English media. I also looked at Hindi and Urdu newspapers but the online archives for these sources are either not maintained or missing for previous years.[7] Table 1. reports the variables I code.

Cow-related Violent Events			
Variable	Description	Type	Values
Date	Reported date of the event	date	13mar2017
Location	Reported location of the event	string	Shivpuri
District	District corresponding to the location	string	Patna
State	State corresponding to the location	string	Bihar
Location Type	Urban or Rural	string	Urban
Longitude	Longitude corresponding to the location	num	74.1256
Latitude	Latitude corresponding to the location	num	24.6481
Perpetrator	Social identity of the perpetrator	string	Hindu/Police
Victim	Social identity of the victim	string	Muslim/Unknown
# of Perpetrators	Reported number of perpetrators	num	8
# of Victims	Reported number of Victims	num	2
Role of Police	Ordinal role of police	num	-2 to 2
Killed	Number of reported killed	num	1
Injured	Number of reported injured	num	3
Hindutva	Involvement of radical Hindu orgs	dummy	yes/no
Social Media	Social media instigated violence	dummy	yes/no
Whatsapp	Whatsapp instigated violence	dummy	yes/no

Table 1: Cow-related violence dataset (May 2014 - May 2019)

I created a *state-day* level dataset with this information. Aggregation to a lower level is deferred at the moment due to limited number of events and irregularities in data at lower levels.[8] Nonetheless, states still provide a decent point of comparison with 10 out

[6]Keyowrds are: *Gau raksha, gau rakshak, cow violence, cow slaughter, cow vigilantes, cow lynching.*

[7]Online archive of Daily Khabrain, the biggest Urdu newspapers, does not extend beyond April 2019 months as of October 18, 2019. Similarly, online archive for Dainik Bhaskar, the largest Hindi newspaper, does not extend beyond October 2017.

[8]I initially decided to aggregate events at constituency level, but the problem was (1) a few constituencies overlapped with many districts, or (2) a district contained many constituencies. On the other

of 30 states experiencing no cow-related violent events. Table 2. shows the statewide distribution of cow-related events and political opportunities (size of population, right-wing government, and legal provisions on cow-slaughter). I use *logistic regression* to measure the effect of previous violent events on the probability of future violence.

Dependent variable:

Dependent variable is a cow-related violence coded as binary on the reported date. It is coded as 1 if an incident takes places and 0 if it doesn't. There are total 157 events among 55,020 daily state-level observations qualifying it for a rare event. Lowest number of events were recorded in 2014 (5) and the highest in 2017 (44) and 2016 (42) respectively. There was one cow-related violence event at its peak. The average number of victims is 2.5. Maximum number of reported killed victims is 4 and reported injured victims is 25.

Explanatory variable(s)

I have proposed that greater exposure to previous violent event pushes the observers to future violence by decreasing resistance to violence. This effect has previously been tested for racial riots [Myers, 1997], protests [Soule, 1997], and xenophobic violence in Germany [Braun and Koopmans, 2009] and Netherlands [Braun, 2011]. My operationalization is different because I account for variation in the effect of previous event based on how distant or closer they are to the observer. I use three measures for exposure: (1) *number of previous events nationwide*, *number of events statewide*, and *number of events in 100 miles radius*. I expect that events in close vicinity will have a greater effect on future violence. This is due to variation in predisposing or trigger factors that concentrate space.

I use *containment failure* variable based on the police response to cow-related violence. This variable is coded as 1 if police fails to file a report against the perpetrators or apprehend them. It also includes the cases where police apprehends the victim instead of the perpetrators. The expectation is that if police fails to respond appropriately to

hand, the data on population is aggregated at district level. I decided to stick with state-level for the time being.

Cow-related Violence by Indian States				
State	Events	Cow-Slaughter Crime	Hindu Majority	BJP Government*
Andhra Pradesh		x	x	
Arunachal Pradesh				
Assam	4	x	x	+
Bihar	9	x	x	
Chhattisgarh		x	x	x
Goa		x	x	+
Gujarat	7	x	x	x
Haryana	17	x	x	+
Himachal Pradesh	2	x	x	x
Jammu and Kashmir	6	x		
Jharkhand	15	x	x	+
Karnataka	19	x	x	-
Kerala			x	
Madhya Pradesh	9	x	x	+
Maharashtra	3	x	x	+
Manipur	1			
Meghalaya				
Mizoram				
Nagaland				
Odisha	3	x	x	
Punjab	1	x		
Rajasthan	15	x	x	+
Sikkim			x	
Tamil Nadu		x	x	
Telangana	3	x	x	
Tripura			x	-
Uttar Pradesh	34	x	x	-
Uttarakhand		x	x	-
West Bengal	4	x	x	
Delhi	5	x	x	-

Table 2: Cow-related violence dataset (May 2014 - May 2019)

Note: * The cross sign indicates BJP was in government for the whole observation period. The addition the substation signs indicate that BJP was in government for more than half and less than half of the observation period respectively.

cow-related violent events, it would straighten heuristic or template of action by reducing the expected cost associated with engaging in violence.

I use *geographical proximity* to previous event as a proxy to ecological factors that predispose observers in one area more to violence than those in another. One of the most critical variable in this sense is the demographic or ethnic makeup of the geographical unit. Violence will be more likely to erupt and spread in large population. Similarly, how various ethnicities and resources are divided could lead to different likelihood of violence. Geographical proximity also increases likelihood of violence because the exemplars and emulators share similar political opportunities. I expect these factors would combine to create situations where template of action will be activated more often.

Control variable(s)

Literature suggests certain forms of collective action like protests or social movements manifest themselves when political opportunities for mobilization are available [Tarrow, 2011, Kriesi et al., 2004]. *Opportunities* refers to possibilities, constraints, and threats exogenous to the mobilizing group, which affect its size and ultimately determine the degree to which group realizes its collective interests [Tarrow, 1996]. Previous explanations portray BJP government as a key instigating factor of violent events [Ganguly, 2019, Kim, 2017]. I derive from these studies that opportunities for cow-related violence are greater when the *BJP is in government* and vice versa. I also employ vote share of BJP as proxy for extremist sentiment among the voting population. A quantitative study based on electoral success of Indian parties suggests riots increase with increase in vote share of the BJP [Nellis et al., 2016]. Greater the *vote share of BJP*, greater will be religious extremism among the population resulting in greater likelihood of emulation of violence. Some studies treat *turnout* as a crucial variable because the likelihood of extra-institutional mobilization decreases when people choose an institutional path to express their grievances [Braun, 2011]. The likelihood of unorganized collective violence would decrease if more people are engaged in legitimate forms of political action. I also

use *ban on cow-slaughter* to control for legal provisions that encourage vigilantism. Only 7 out of 30 states allow slaughter of cows.

Violence is more likely to diffuse through units with large population. I include a *logged population* variable to capture this effect. Ethnic competition theories suggest that conflict is most likely over shared scarce resources [Horowitz, 2000, Barth, 1969, Spilerman, 1971, Olzak, 1992]. I include a Hindus to Muslims *population ratio* variable to capture ethnic competition. Intuition behind this is that violence will be more likely when groups are in parity, which in turn would increase collective insecurity and competition over resources.

Analysis

Table 3. shows the results for various factors affecting the epidemic spread of unorganized violence. Model 1. suggests that number of previous events nationwide has very little effect on other violent events. This effect is statistically significant on one-tailed test i.e. $p < .1$. Model 2. explores whether previous violent events affect likelihood of events in the same unit by testing the effect of statewide events on the likelihood of future events. Greater number of events in the same state increase the likelihood of the future violence as shown in Figure 1. The most pronounced and significant effect is of failed containment. Violence spreads when state fails to curb violence by arresting the perpetrators (shown in Figure 2). These findings lend some credibility to the mechanism I propose. *Unorganized violence spreads like an epidemic in the absence of proper containment.* Similarly, frequent violent events reduce the resistance of observers making future violence more likely. Predisposed observers are less affected by the events farther away and more by events in their close proximity. This fits well with the epidemic logic: the closer one is to the source of infection, the more likely he is to develop the disease. This effect is verified by the two operationalizations of distance I use in my model. A violent event increases the likelihood of events in its 100 miles radius. Concentration of events in close vicinity predict greater likelihood of future events in that locality, affirming

the previous theories of clustering of violence. Geographical distance has a positive but decaying effect as shown in the Figure 3.[9]

The effect control variables is mostly in line with my expectations with a few exceptions. Violence is more likely in crowded units. The result also show that BJP Government or the extremist BJP voters are not necessarily contributing to violence − at least at the state level, but these results must be considered with a grain of salt because BJP is in government in the center since 2014. The argument that contagion of violence, especially unorganized one, is likely but mediated by ecological factors i.e. the political and demographic conditions under which it takes place, finds some support through these results. Exposure to previous violent events increase likelihood of violence in the recent cow-related violence epidemic just as exposure to an infected patient increases the likelihood of infection during an natural epidemic. This observation provides food for thought related to how we perceive violence as an outcome but seldom as a self-organizing process.

[9]Results from a separate model including squared and cubed terms for geographical distance presented in the appendix.

	Model 1	Model 2	Model 3	Model 4
No. of Events (nationwide)	0.01†			
	(0.01)			
No. of Events (statewide)		0.03*	0.02†	
		(0.01)	(0.01)	
No. of Events (100 mi radius)				0.04*
				(0.02)
Geographical Proximity			0.01**	0.01**
			(0.01)	(0.01)
Containment Failure	2.19**	1.88**	1.84**	1.85**
	(0.27)	(0.27)	(0.27)	(0.26)
Ban on Cow-slaughter	1.46	1.74†	1.60	1.56
	(1.05)	(1.06)	(1.06)	(1.06)
Logged Population	0.48**	0.39**	0.37**	0.39**
	(0.13)	(0.13)	(0.13)	(0.12)
Population Ratio (H/M)	0.42†	0.31	0.24	0.24
	(0.22)	(0.22)	(0.22)	(0.22)
Voter Turnout	0.01	0.01	0.01	0.01
	(0.02)	(0.02)	(0.01)	(0.01)
Right-wing Vote Share	0.01	0.00	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Right-wing Government	-0.13	-0.07	-0.00	-0.05
	(0.28)	(0.28)	(0.29)	(0.30)
Constant	-17.20**	-15.85**	-15.61**	-16.05**
	(3.15)	(3.15)	(3.04)	(3.01)
Observations	53186	53186	53186	53186
Pseudo R^2	0.121	0.122	0.132	0.133

Standard errors in parentheses

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 3: Logistic regression results for cow-related violent epidemic in India.

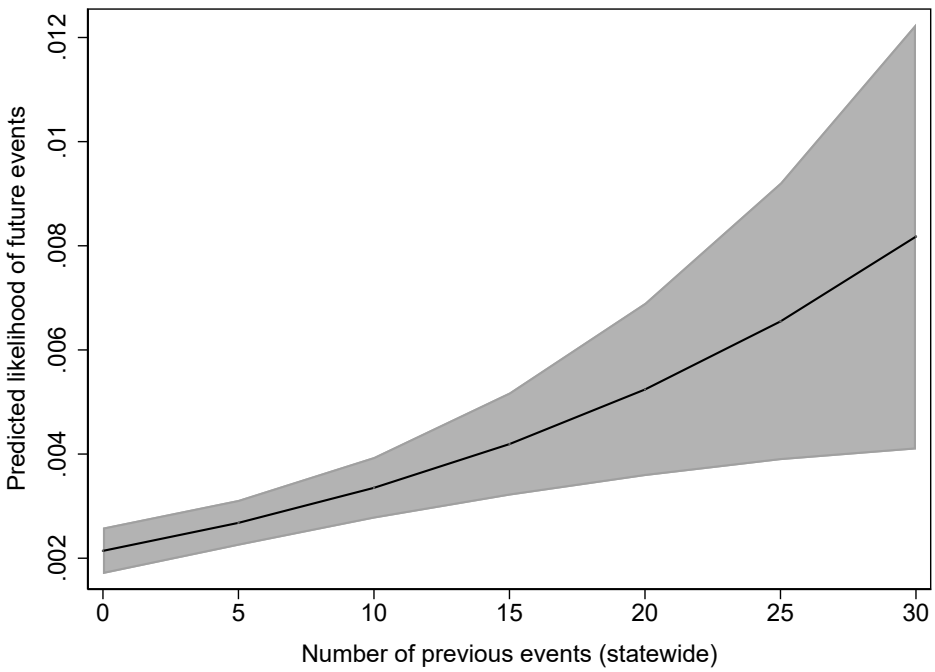

Figure 1: The effect of previous events at state-level on future violence.

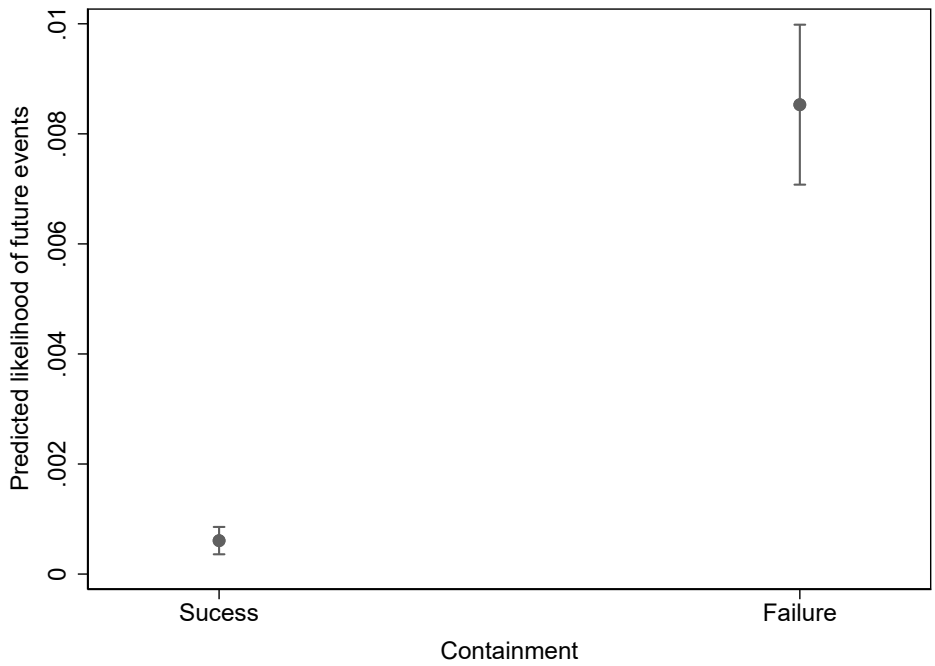

Figure 2: The effect of containment (police action) on cow-related violence.

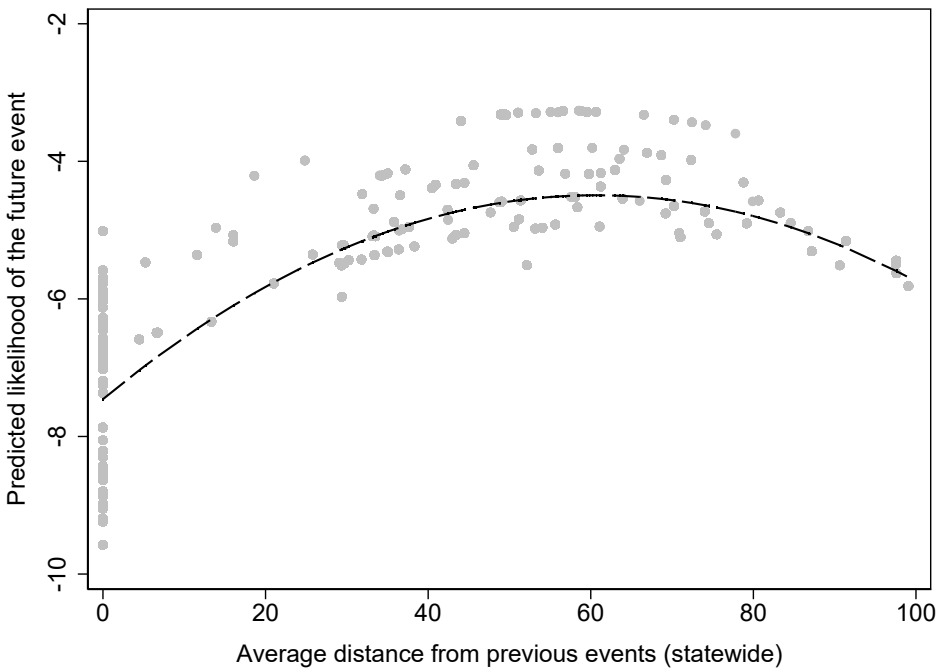

Figure 3: The decaying effect of geographic distance on future violence.

Further Research

There are a few shortcomings of this study that can be addressed in the future research. The first issue is disaggregation of data to a lower level. Second task is to create comparison categories. Cow-related violence is one among many forms of communal violence (physical assaults, assault on private property, desecration of places of worship, and forced displacement among others). Argument about epidemic spread can be strengthened by showing that cow-related violence spreads more rapidly than other forms. Previous history of violence is a risk factor that I have considered, but couldn't find appropriate data. I assessed the feasibility of data on riots collected by [Varshney, 2006], but it does correspond to the current state borders. I also plan to collect data on the longevity of exposure i.e. for how long does an event *resonate* in media. [Braun, 2011] show that events that stay under the spotlight longer are more infectious than others. I also extend this model to include the role of local networks.

I want to extend this framework and develop a model that can be applied to other cases. Bencek and Strasheim have a district level dataset on xenophobic violence in

Germany codes anti-refugee events [Benček and Strasheim, 2016]. I plan to apply this framework to these events and leverage geographical and social proximity as well as right-wing networks to explore the dynamics of anti-refugee violence. I could also distinguish which form of unorganized violence four types coded − assault, arson, demonstrations, and miscellaneous attacks − is more contagious than other i.e. likely to be emulated by random observers elsewhere. I also plan to collect data on xenophobic violence in Turkey in near future for the same purpose.

Conclusion

I have proposed unorganized collective violence spreads like an epidemic in this paper. Although this diagnosis is retrospective, this conception helps me shed light on how state's inability to contain initial violence event could increase the likelihood of violence in the long run. This theory differs from the standard diffusion models through its emphasis on *repetitive exposure* that reduces *resistance* to a unusual or novel form of action, and a *combination* of personal (micro/unit-specific) and ecological (macro/system-specific) factors that predispose some actors to *emulate* a certain *template of action* earlier than others. This framework can be applied to various forms of actions that rapidly spread among separated and uncoordinated actors. It also provides an answer for why certain forms of action spike suddenly even when there is no apparent change in ecological conditions. Conceptualizing unorganized collective violence as epidemic sheds light on violence as a self-organizing phenomenon.It also highlights the importance of otherwise ignored random acts of violence, which can produce sustained spells of violence if responded to appropriately by the state. In the light of the case presented above, the epidemic process is readily applicable to various forms of *unorganized violence* that come out of blue but spread rapidly among the society. Riots, lynchings, vandalism, xenophobic violence, and lone-wolf attacks are the cases where application of epidemiological analogies can be useful.

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Appendix

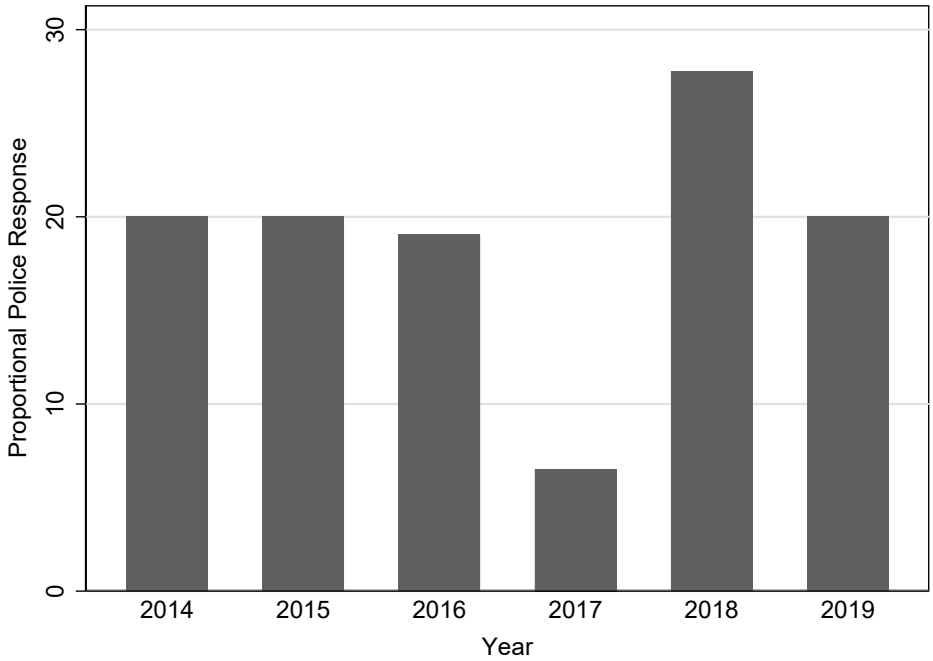

Figure 4: Satisfactory police response proportional to cow-related violence events since 2014.