Diffusion of Protests: Toward an Inter-Event Approach

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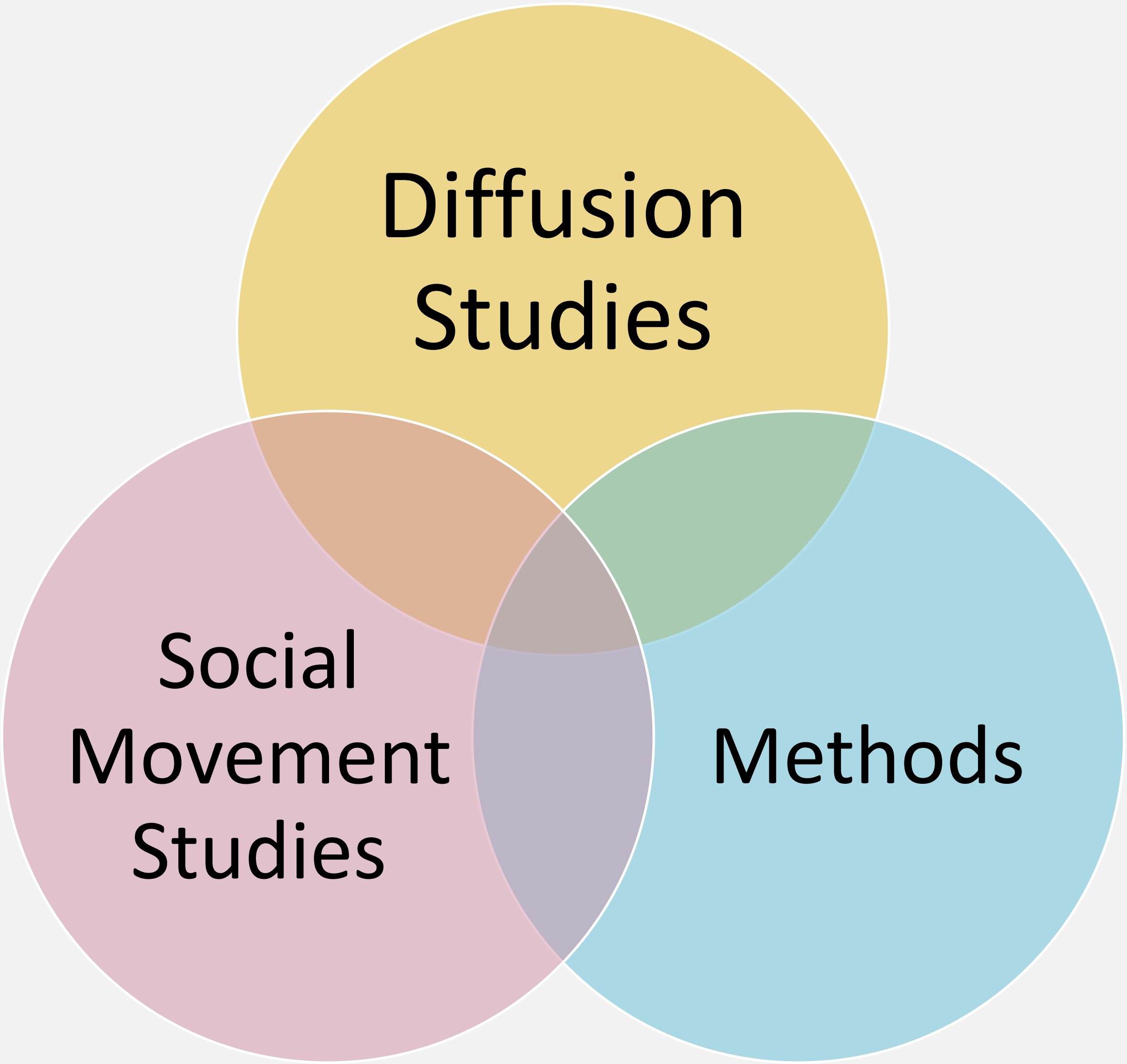
- Zhang & Cai (2021).
    - Tony Huiquan Zhang & Tianji Cai. (2021). "*Measuring Event Diffusion Momentum (EDM): Applications in Social Movement Research*", manuscript under review.


Diffusion Studies
Social Movement Studies
Methods

Outline

- Intro - *Diffusion Studies in General*
- Context - *Social Movement Studies about Protest Diffusion*
- Research Design - *A 5-Step Method for "Event Diffusion Momentum"*
- Analysis - *Data,Variables and ZIP/ZINB Models*
- Findings - *Results from Three Studies*
- Discussions - *Implications and Future Agenda*

Introduction

Diffusion is Not New

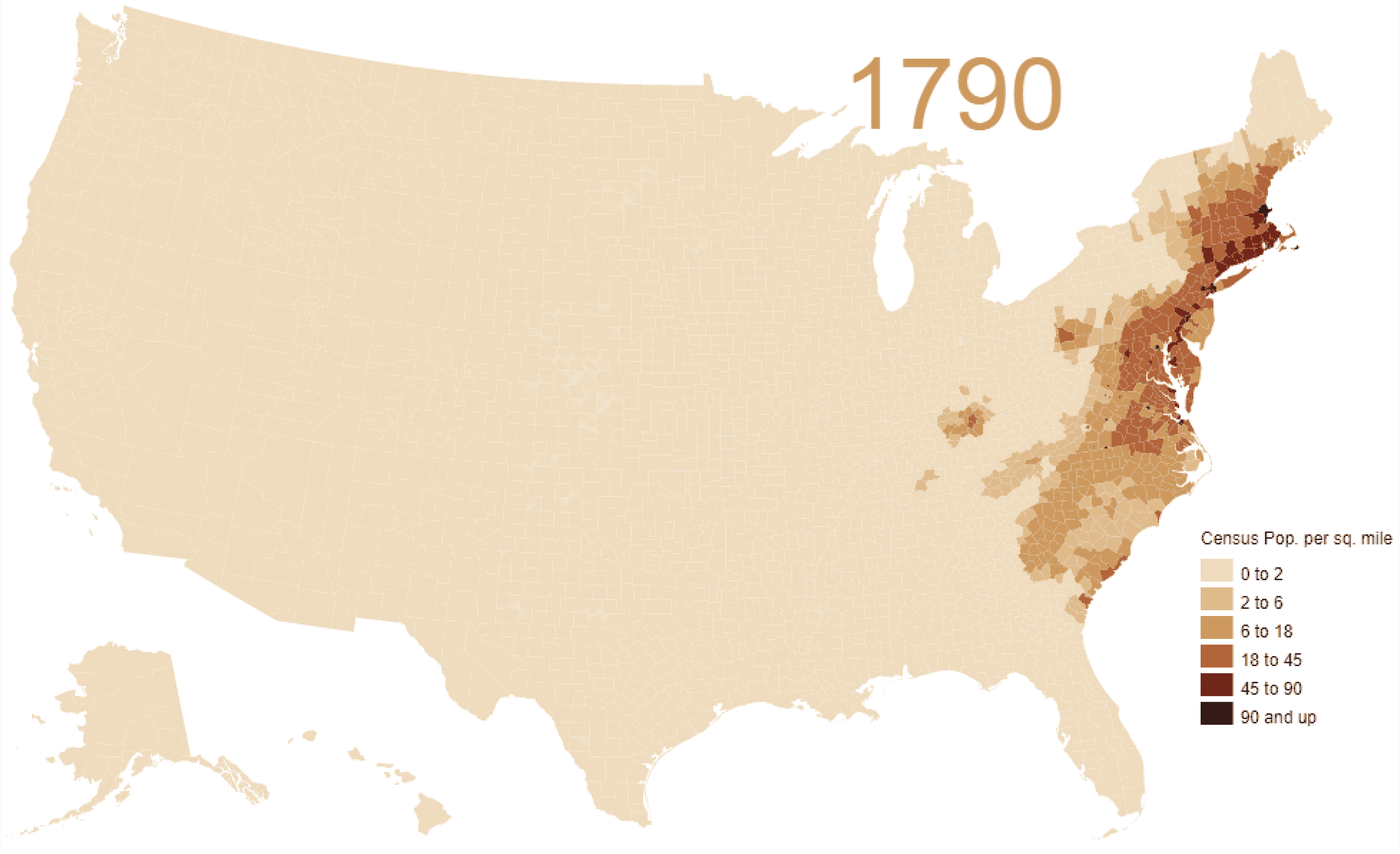
- History/Historical Geography
  - Population Migration (Quintana-Murci et al. 1999. *Nature Genetics*)
  - Wars & Conflicts (Beardsley. 2011. *Journal of Politics*)
  - Political Expansion (Weyland. 2010. *Comparative Political Studies*)

- History of Science/Technology
  - Language, Writing Systems, Symbols, Numbers and Notations…
    - *(Rickford. 1986. Language; Hoffer 2002; Durbin 1971)*
  - Tales, Stories, Legends, Beliefs, Religion, and Ideology...
    - *(Porter 2004; LaFree et al. 2018; Starr 1991)*
  - Technology and Innovations…
    - *(Stoneman & Diederen. 1994. The Economic Journal; Abrahamson & Rosenkopf. 1997. Organization science)*

Political Expansion

- Source:
- https://commons.wikimedia.org/wiki/File:Zh-Territories_of_Dynasties_in_China.gif

Population Diffusion



- Source:
- Vividmaps.com

Spread of Corn

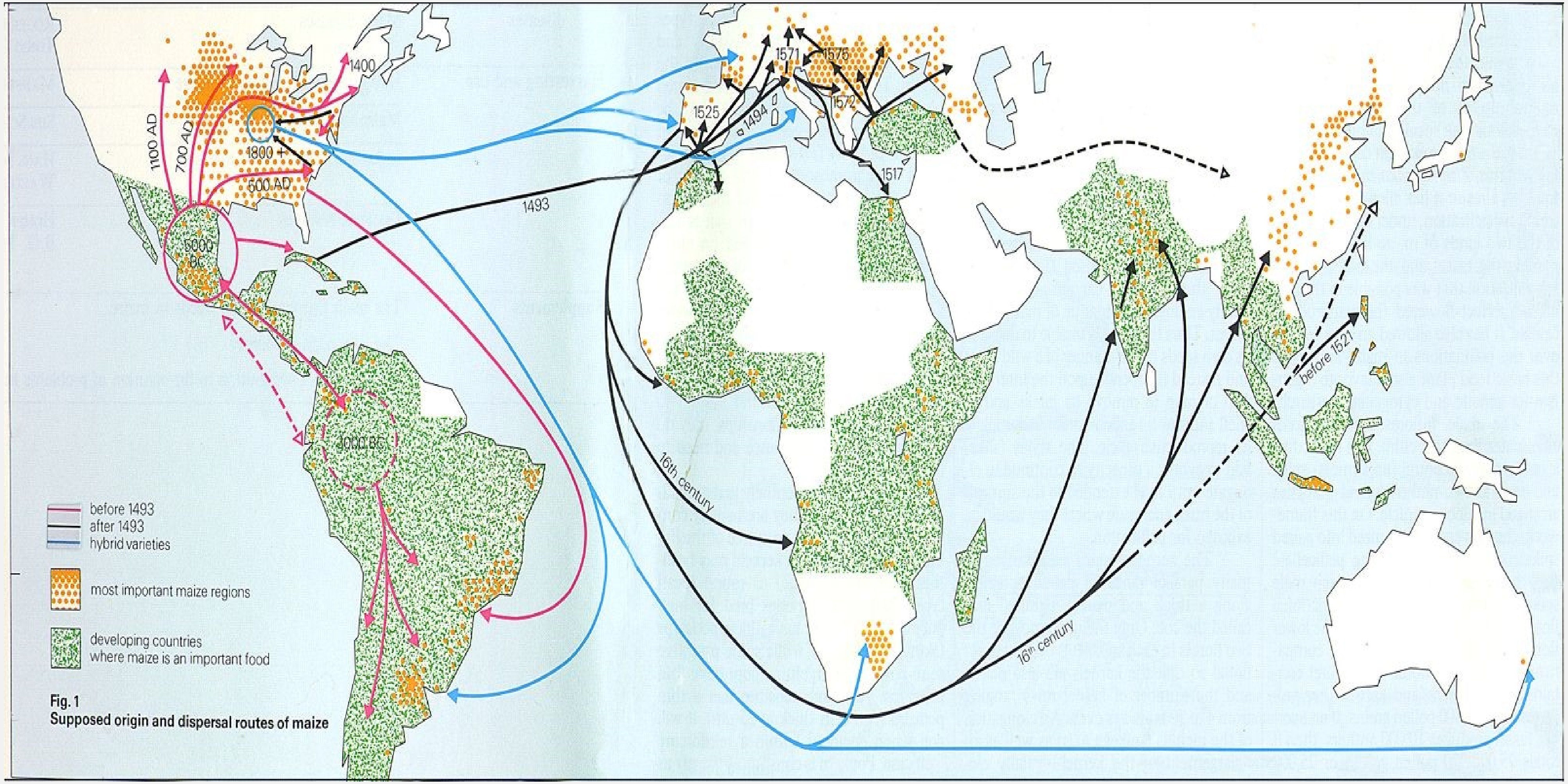


Fig. 1
Supposed origin and dispersal routes of maize

- Image Source:
- https://digital.library.illinois.edu/items/dd6d47c0-0d92-0135-23f6-0050569601ca-1

Diffusion of COVID-19

- Source:
- https://digital.library.illinois.edu/items/dd6d47c0-0d92-0135-23f6-0050569601ca-1

Diffusion Studies

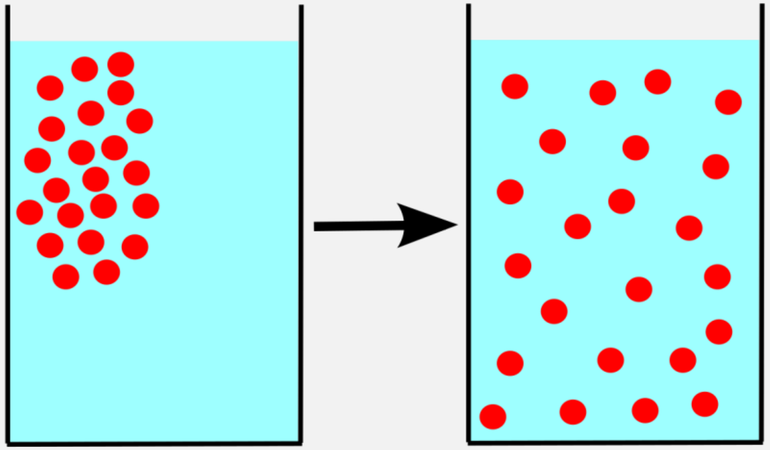
- Diffusion has been an important topic in many disciplines - both natural and social sciences.
- Biology, Epidemiology and Public Health
- Social Sciences
  - Management/Business
    - *Financial and Business Models, Organizations, Management Practices…*
    - *Brands, Fashion, Innovations, Consumer Behaviors*
  - Politics/Sociology/Public Administration
    - *Diffusion of Pop Culture, Ideology, …*
    - *Adoption of Policies, Institutions and Laws...*
  - Criminology…
    - *Crimes – especially copy-cats*

What is diffusion?

Diffusion Studies

- Diffusion:
  - The movement of people/objects/actions/events over time and space (from A to B);
  - or, the adoption of practice/innovation/technology/ institutions over time (from 0 to 1).

  - Usually – Expansion in space & time / Rise in numbers
  - The opposite process: decay



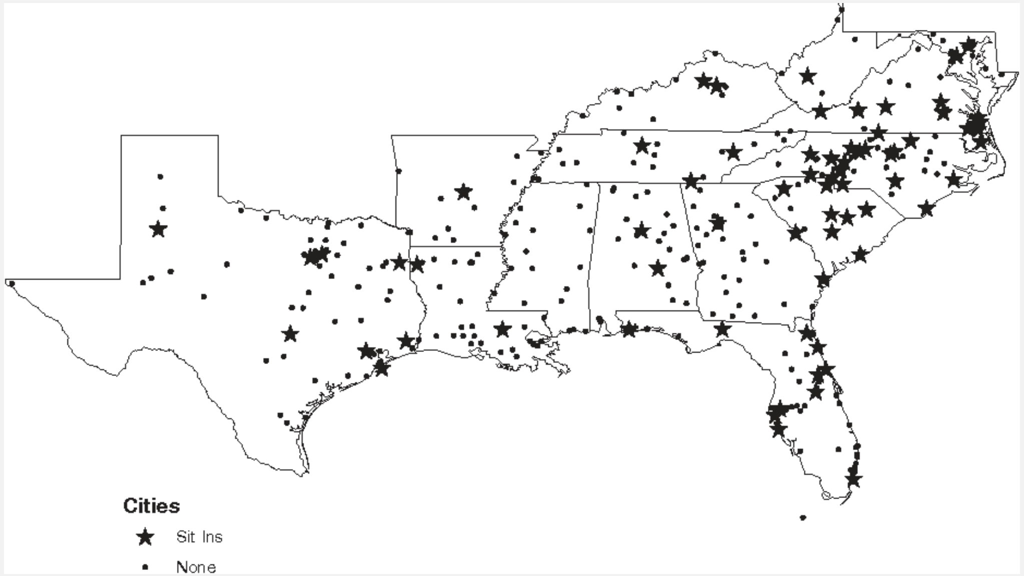


Image source: Andrew & Biggs 2006.

Two Types of Diffusion

- Cumulative and non-cumulative diffusion

- Cumulative Examples:
  - Writing, Printing, Telephone, Railway, Women's Voting Rights, Vaccination

- Non-cumulative Examples:
  - Wars, Conflicts, Protests, Crimes

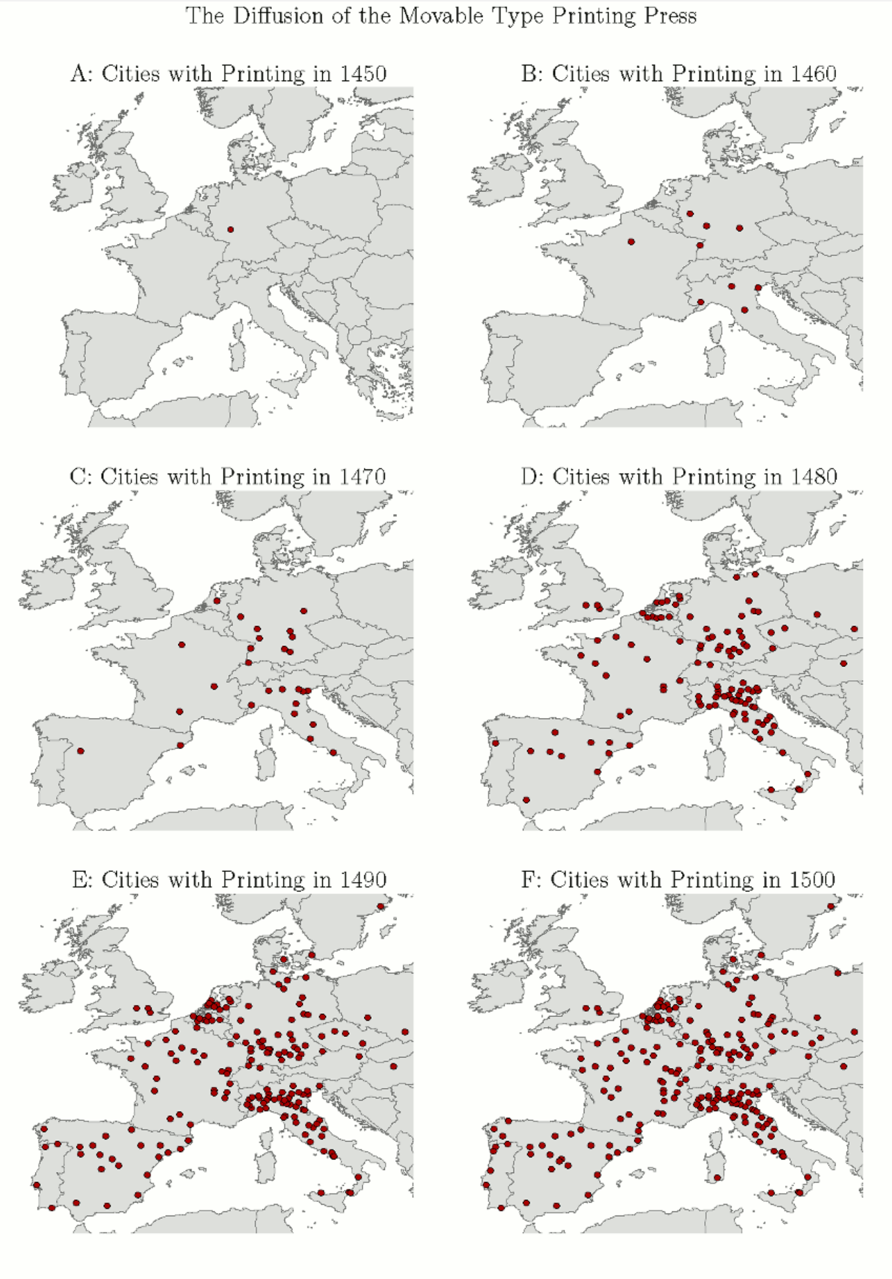


Image source: Dittmar 2011.

Diffusion Studies in Business & Management

- Usually cumulative models.
- Diffusion of technological innovation, organizational practices, new product acceptance…
- Innovation Diffusion Models
  - Mahajan, V. (2010). Innovation diffusion.
  - Söderholm, P., & Klaassen, G. (2007).

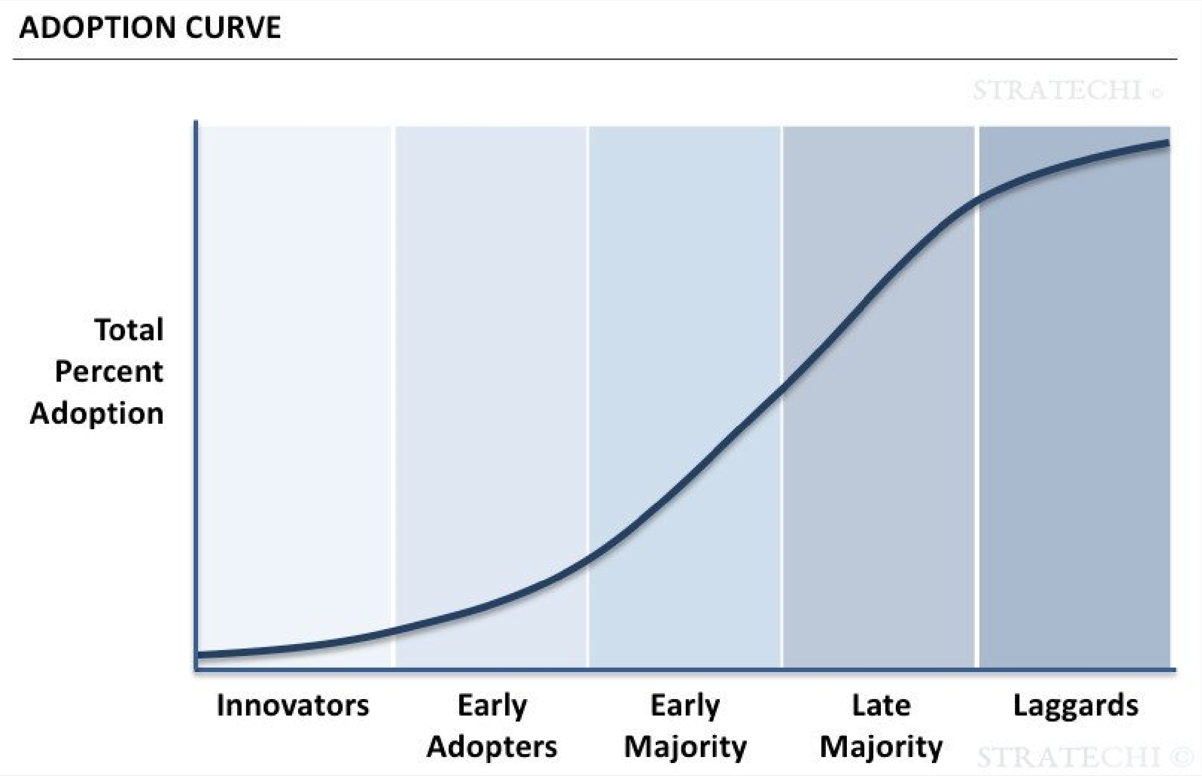


Image source: Stratech.

Epidemiology and Public Health

- Diffusion of diseases
  - E.g. London Cholera Outbreak in 1854

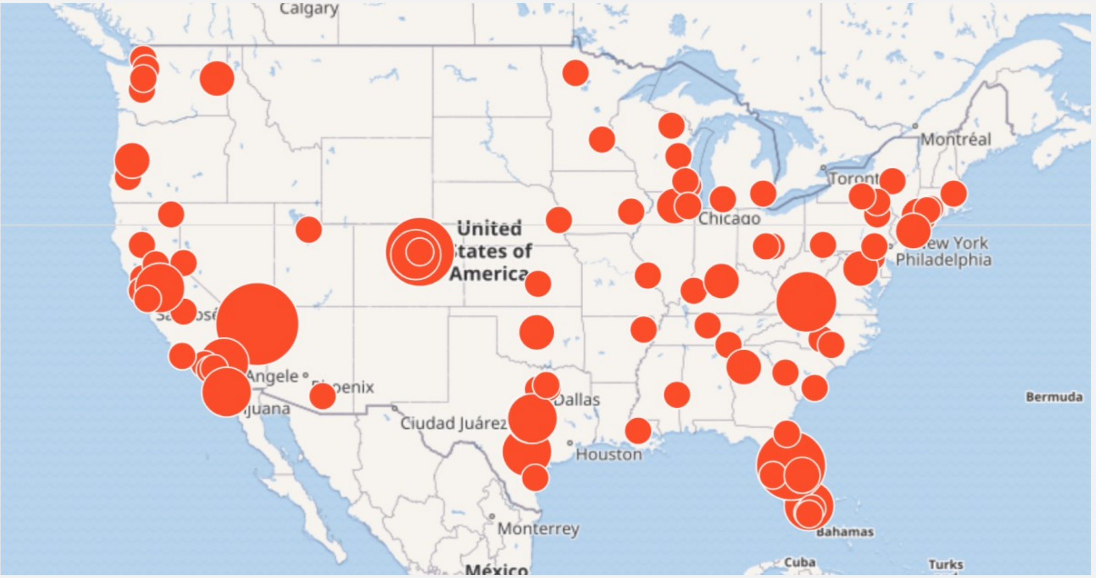
- Spatial Models
- Temporal Models
- Spatial-Temporal Joint Models

图源：游戏《瘟疫公司》

Criminology

- Diffusion of Crimes
  - Copy-cat Crimes
  - 1993 Wave of Air Hijacking (Miller 2007)
- Mechanisms and Explanations
  - Holden, R.T. (1986 - AJS). The contagiousness of aircraft hijacking.
- "Social Contagion"
  - Emotion – Mass Shooting, Suicide
  - Information
  - Inspiration
  - Signaling (Broken Windows Theory)

1993 Air Hijacking Waves in China, NY TIMES



Mass Shootings in USA Image Source: PBS.org

Context

Social Movements and Diffusion

Social Movements and Diffusion

- It is agreed that social movements diffuse.
  - The protests themselves diffuse (Andrews & Biggs 2006 - ASR)
    - *E.g. Civil Rights Movements; Occupy Wall Street Movement; Me-Too Movement*
  - Elements of protests, such as repertoire, strategy, framing and ideology, networks and organizations, personnel and resources, diffuse as well. (Soule 2004)
    - *E.g. Flash Mob (快闪) & #HashTag# as a Protest Action*
  - Emotions and ideology could spread – via direct [friends, networks, organizations] or indirect links [news, media, and social media]

How Protests Diffuse?

- Direct Diffusion (Soule 2004; Wang & Soule 2012)
  - Actual connection through people, networks, organizations

- Indirect Diffusion (Goldstone 2004; Weyland 2019)
  - No actual connection – but behave similarly
    - *When actors face similar structural pressure, they act accordingly and consequently, their action will become similar.*
  - Structural Isomorphism (结构同化、同构)
  - It is argumentative that whether this should be considered diffusion; however, it is true that they will show high correlation and temporal-spatial adjacency.（相关、时空邻接）

Research Gaps (1)

- However, there are some gaps in existing studies of protest diffusion.
  - Too much on context, too little on actions;
  - Too much on when/where/how it diffuses, and too little on "What" diffused
    - *Political Opportunity Theory, Resource Mobilization Theory*
    - *The context, environment, and "field" for diffusion to occur is paid much attention to, but not enough has been paid to the inter-movement dynamics, especially the features of each protest.*

Research Gaps (2)

- However, there are some gaps in existing studies of protest diffusion.
  - Methodological Generalizability
    - *There has not been a widely accepted methodological practice in the field.*
  - Researcher's Bias
    - *Definition & Operationalization (Measurement)*
    - *Ad Hoc; Post Hoc; Subjectivity. (E.g. "Opportunity", "Elite Division", "Network", and even outcome of protest is argumentative – what is a successful/failed protest?…)*

We suggest… (1)

- Turn to Events
  - Turning to the inter-event dynamics of diffusion (Holden 1986)
  - "toward an eventful sociology" (Sewell 1996)
  - "sequence of protests" (Minkoff 1997)
  - Temporal-spatial joint models (Andrews & Biggs 2006; Myers 2010)

- Borrowing wisdom from public health and criminology; focusing on objective information of each event, and how these features affect diffusion.
  - E.g. what kinds of patients/viruses are more contagious?
  - E.g. what kinds of protests are more diffusive?

We suggest… (2)

- Avoid Unnecessary Assumptions and Prerequisites
  - Does diffusion effect always decay (Andrews & Biggs 2006 ASR; Strang 1993 ARS) over time? Not necessarily.
    - *- our method allows either diffusion and decay.*
  - Could unconnected individuals/actors be influenced by each other? Yes. (Mass media & Internet)
    - *- our method assumes all cases could have a potential impact on later actors.*
- Analyze with a standardized methodological practice

Research Method

Table 1 Five-Step Method to Calculate Event Diffusion Momentum (EDM)

Procedure	Values
Step 1: Use an event-based dataset and treat each event *i* as a focal case;	Case *i*
Step 2: Set temporal and spatial ranges of interest;	Define spatial and temporal ranges (*t*) for the present study
Step 3: Count the number of pre/post-event protests within the ranges;	$N_{pre\text{-}t}$; $N_{post\text{-}t}$
Step 4: Fit appropriate count models and get predicted values for each risk factors;	$P_{pre\text{-}t}$; $P_{post\text{-}t}$
Step 5: Calculate the ratios as the EDMs and CIs.	$EDM_t = P_{post\text{-}t}/P_{pre\text{-}t}$ *(CI formula see discussions below.)*

(1) Event-Based Data

- Event as observations/cases.
- Time/Location Information Available
  - for Counting adjacent cases, both temporally and spatially
  - Time: Can be as accurate as month, date, or even sec/min/hr (especially for modern automated big data generation techniques, see Hanna 2017)
  - Location
    - *Longitude, Latitude;*
    - *City/Province/Zipcode/State (depends on what your question is)*

(2) Define the Spatial/Temporal Ranges

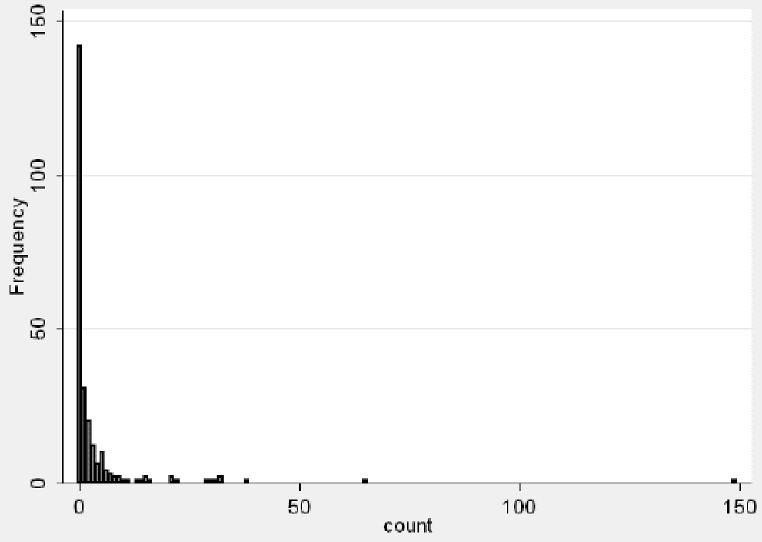
- Spatial
  - Geographic distance? A circle with radius of *n* kilometers.
  - Within the same state. Why?
- Temporal
  - t = 1-90 days
  - April 1, 1960 – Sep 30, 1995

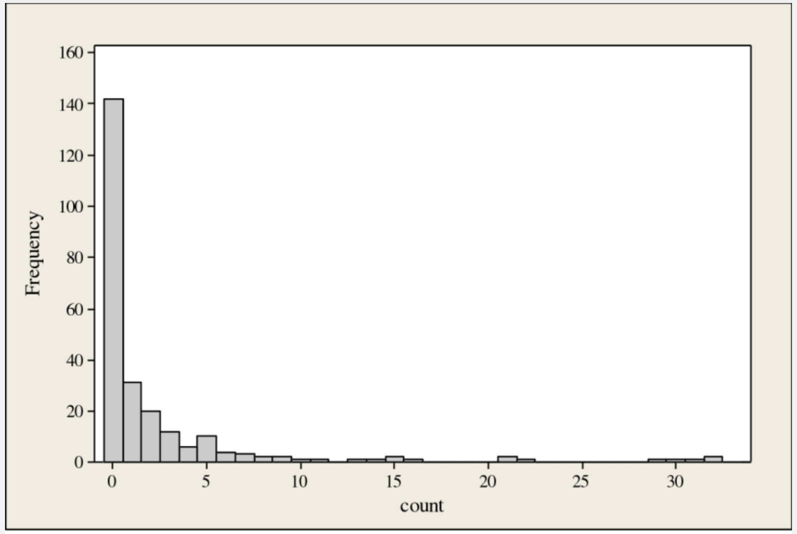
(3) Count the Protests Before/After Each Case

```
> head(event_sub)
       CASEID          STATE POL VIO       DATE SIZE PostAct30 PostAct60
1 CASE_000027       new york   0   0 1960-09-14   10        42        56
2 CASE_000162      tennessee   3   0 1960-03-02   50         9        16
3 CASE_000163      tennessee   3   0 1960-03-02    7         9        16
4 CASE_000164        alabama   0   0 1960-03-04  900        17        18
5 CASE_000165 south carolina   3   0 1960-03-04   26        13        13
6 CASE_000166 north carolina   0   0 1960-03-04   10         9        13
> tail(event_sub)
           CASEID      STATE POL VIO       DATE SIZE PostAct30 PostAct60
19156 CASE_023511   new york   0   0 1995-05-13    2         7        14
19157 CASE_023514   new york   0   0 1995-11-01   50        11        22
19158 CASE_023517   michigan   0   0 1995-11-01 1000         0         0
19159 CASE_023585   new york   0   0 1993-12-15    4         2         7
19160 CASE_023598   new york   0   0 1995-10-16  100        16        27
19161 CASE_023604 california   0   1 1995-08-23    1         4         6
```

(4) Predict with ZIP models

- Count Models
  - DV's values are natural numbers: 0, 1, 2, 3, …
  - To count stuff. (e.g. How many apples you harvested today? How many 911 calls in the past hour? How many traffic violations in this street today?)
- Commonly used types
  - Poisson, Negative Binomial (NB), Zero-inflated Poisson (ZIP) and Zero-inflated Negative Binomial (ZINB)
  - NB: over-dispersion
  - ZI: excessive zeros
- Why ZIP?





Appendix Table 1 Predicted Counts of Precedent Protests (P-pre t) from ZIP Models (Standard Errors in Parentheses)

	Model 1 Pre_{01}	Model 2 Pre_{02}	Model 3 Pre_{03}	Model 4 Pre_{04}	Model 5 Pre_{07}	Model 6 Pre_{14}	Model 7 Pre_{30}	Model 8 Pre_{60}
Count model: (Intercept)	0.41***	0.93***	1.17***	1.35***	1.72***	2.18***	2.71***	3.23***
	(0.04)	(0.03)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Count model: DECADE70s	-0.18***	-0.19***	-0.17***	-0.17***	-0.15***	-0.12***	-0.05***	0.02***
	(0.03)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
Count model: DECADE80s	-1.06***	-1.04***	-1.00***	-0.97***	-0.95***	-0.89***	-0.87***	-0.84***
	(0.08)	(0.04)	(0.03)	(0.03)	(0.02)	(0.01)	(0.01)	(0.01)
Count model: DECADE90s	-0.73***	-0.76***	-0.74***	-0.71***	-0.68***	-0.64***	-0.62***	-0.60***
	(0.08)	(0.05)	(0.04)	(0.03)	(0.02)	(0.01)	(0.01)	(0.01)
Count model: LOGSIZE	-0.04*	-0.03**	-0.02*	-0.02**	-0.02**	-0.02***	-0.01***	-0.01***
	(0.02)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Count model: FORMRally/March	0.09**	0.09***	0.07***	0.08***	0.07***	0.08***	0.07***	0.05***
	(0.03)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)
Count model: FORMDrama/Ceremony/Other	0.24***	0.14***	0.10***	0.14***	0.12***	0.08***	0.07***	0.02**
	(0.05)	(0.03)	(0.03)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
Count model: FORMViolence/Conflict	0.01	0.01	0.05	0.04	-0.01	-0.08***	-0.09***	-0.09***
	(0.06)	(0.04)	(0.03)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
Count model: FORMLegal/Institution	-0.13**	-0.10***	-0.11***	-0.12***	-0.16***	-0.16***	-0.17***	-0.15***
	(0.05)	(0.03)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.00)
Count model: POP	0.07***	0.05***	0.05***	0.07***	0.08***	0.10***	0.10***	0.10***
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Count model: SMO	-0.04**	-0.02*	-0.01	-0.01	0.00	0.01	0.02***	0.04***
	(0.02)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Count model: POL	-0.06***	-0.05***	-0.05***	-0.06***	-0.07***	-0.08***	-0.09***	-0.09***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Count model: VIO	0.25***	0.19***	0.17***	0.19***	0.21***	0.19***	0.13***	0.12***
	(0.05)	(0.03)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
Zero model: (Intercept)	0.39***	0.16*	-0.07	-0.31***	-0.66***	-1.15***	-1.78***	-2.35***
	(0.08)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.07)	(0.09)
Zero model: DECADE70s	-0.03	-0.05	0.00	0.04	0.04	0.07	0.24***	0.37***
	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.06)

(5) Calculate the CIs and DIs

DI is calucated as ratio of the predicted counts, namely, $P_{pre\text{-}t}$ and $P_{post\text{-}t}$ obtained from the model specified in Step 4. The correspoding variance can be approximated using delta method (Papanicolaou 2009; Xu and Long 2005). For example, we have

$$E(DI_t) \approx \frac{\hat{P}_{post\_t}}{\hat{P}_{pre\_t}} \; and$$

$$var(DI_t) \approx \frac{1}{\hat{P}^2_{pre\_t}} var(\hat{P}_{post\_t}) + \frac{\hat{P}^2_{post\_t}}{\hat{P}^4_{pre\_t}} var(\hat{P}_{post\_t}) - \frac{\hat{P}_{post\_t}}{\hat{P}^3_{pre\_t}} cov(\hat{P}_{post\_t}, \hat{P}_{pre\_t})$$

$$= \left(\frac{\hat{P}_{post\_t}}{\hat{P}_{pre\_t}}\right)^2 \left(\frac{var(\hat{P}_{post\_t})}{\hat{P}^2_{post\_t}} + \frac{var(\hat{P}_{pre\_t})}{\hat{P}^2_{pre\_t}} - 2\frac{cov(\hat{P}_{post\_t}, \hat{P}_{pre\_t})}{\hat{P}_{post\_t} \times \hat{P}_{pre\_t}}\right).$$

If we further assume $P_{pre\text{-}t}$ and $P_{post\text{-}t}$ are indepdent, then it yields

$$var(DI_t) \approx \left(\frac{\hat{P}_{post\_t}}{\hat{P}_{pre\_t}}\right)^2 \left(\frac{var(\hat{P}_{post\_t})}{\hat{P}^2_{post\_t}} + \frac{var(\hat{P}_{pre\_t})}{\hat{P}^2_{pre\_t}}\right).$$

```r
y1 = ggeffects::ggpredict(n1, terms = j, type = 'zero_inflated'
y2 = ggeffects::ggpredict(n2, terms = j, type = 'zero_inflated'

PRE  = y1$predicted
POST = y2$predicted

fit = log(y2$predicted/y1$predicted)

ratio = exp(fit)

cov1<-vcov(n1)[1:ncol(x1),1:ncol(x1)]
cov2<-vcov(n2)[1:ncol(x2),1:ncol(x2)]
v.d = x1%*%cov1%*%t(x1)+x2%*%cov2%*%t(x2)
se = sqrt(diag(v.d))

upper = exp(fit + 1.96*se)
lower = exp(fit - 1.96*se)
```

A Five-Step Method to Measure Diffusion

- ❑ (1) Use event-based data (protests as cases, with key information such as time/location and other features)
- ❑ (2) Define the temporal (T) and spatial/geographical ranges (S);
- ❑ (3) For each observation, count the numbers of events (N) that occurred before and after the selected observation within the defined temporal and spatial ranges;
- ❑ (4) Predict the counts (P) with appropriate models;
- ❑ (5) Calculate the ratios of predicted values (P) from post-event and pre-event count models for corresponding predictors, which are the risk factors; use delta method to generate the CI of the ratio.

✓ <u>The ratio will serve as the diffusion indices (DIs) and corresponding Confidence Intervals (CIs) will be calculated as well.</u>

Method

Data, Variables and Modeling

(1) Dynamics of Collective Action (DOCA) data

- DOCA is the most widely used social movement data in American sociology of contentious politics (publications in ASR, AJS, ARS, SF, SMS, Mobilization…)
- DOCA records more than 23,000 protests that took place during 1960-1995, in the USA.
- DOCA's information source is New York Times' reports on the contentious incidents.
- DOCA records the following variables:
  - Time / Location – the key information to measure diffusion
  - Size, Form of Action, Population composition, Social Movement Organizations involved, Policing and Violence

Party Affiliation Data

- Online Scraping (Wikipedia) + Data Cleaning
- All presidents, governors from 1960/01/01 – 1995/12/31.

Oklahoma	OK	List of governors of Oklaho	23	Henry Bellmon(1921?2009)	Republican	1987	1	12	1991	1	14
Oklahoma	OK	List of governors of Oklaho	24	David Walters(b. 1951)	Democratic	1991	1	14	1995	1	09
Oklahoma	OK	List of governors of Oklaho	25	Frank Keating(b. 1944)	Republican	1995	1	09	2003	1	13
Oregon	OR	List of governors of Oregon	29	Mark Hatfield	Republican	1959	1	12	1967	1	09
Oregon	OR	List of governors of Oregon	30	Tom McCall	Republican	1967	1	09	1975	1	13
Oregon	OR	List of governors of Oregon	31	Robert W. Straub	Democratic	1975	1	13	1979	1	08
Oregon	OR	List of governors of Oregon	32	Victor Atiyeh	Republican	1979	1	08	1987	1	12
Oregon	OR	List of governors of Oregon	33	Neil Goldschmidt	Democratic	1987	1	12	1991	1	14
Oregon	OR	List of governors of Oregon	34	Barbara Roberts	Democratic	1991	1	14	1995	1	09
Oregon	OR	List of governors of Oregon	35	John Kitzhaber	Democratic	1995	1	09	2003	1	13
Pennsylva	PA	List of governors of Pennsy	37	David L. Lawrence	Democratic	1959	1	20	1963	1	15
Pennsylva	PA	List of governors of Pennsy	38	William Scranton	Republican	1963	1	15	1967	1	17
Pennsylva	PA	List of governors of Pennsy	39	Ray Shafer	Republican	1967	1	17	1971	1	19
Pennsylva	PA	List of governors of Pennsy	40	Milton Shapp	Democratic	1971	1	19	1979	1	16
Pennsylva	PA	List of governors of Pennsy	41	Dick Thornburgh	Republican	1979	1	16	1987	1	20
Pennsylva	PA	List of governors of Pennsy	42	Bob Casey Sr.	Democratic	1987	1	20	1995	1	17
Pennsylva	PA	List of governors of Pennsy	43	Tom Ridge	Republican	1995	1	17	2001	10	05
Rhode Isla	RI	List of governors of Rhode I	64	Christopher Del Sesto	Republican	1959	1	06	1961	1	03
Rhode Isla	RI	List of governors of Rhode I	65	John A. Notte, Jr.	Democratic	1961	1	03	1963	1	01
Rhode Isla	RI	List of governors of Rhode I	66	John Chafee	Republican	1963	1	01	1969	1	07
Rhode Isla	RI	List of governors of Rhode I	67	Frank Licht	Democratic	1969	1	07	1973	1	02
Rhode Isla	RI	List of governors of Rhode I	68	Philip W. Noel	Democratic	1973	1	02	1977	1	04
Rhode Isla	RI	List of governors of Rhode I	69	J. Joseph Garrahy	Democratic	1977	1	04	1985	1	01
Rhode Isla	RI	List of governors of Rhode I	70	Edward D. DiPrete	Republican	1985	1	01	1991	1	01
Rhode Isla	RI	List of governors of Rhode I	71	Bruce Sundlun	Democratic	1991	1	01	1995	1	03
Rhode Isla	RI	List of governors of Rhode I	72	Lincoln Almond	Republican	1995	1	03	2003	1	07
South Car	SC	List of governors of South C	106	Ernest Hollings	Democratic	1959	1	20	1963	1	15

Variables

- Basics
  - Date (to count cases within certain ***t*** days)
  - Location (State information was used to count cases)

- Risk Factors
  - Size of protest (1-9, 10-49, 50-99, 100-999, 1000-9999, 10000+)
  - Form of action (strikes, rallies, ceremonies, conflicts, legal actions…)
  - SMOs (number of organizations)
  - Policing (DUMMY: whether policing happens?)
  - Violence (DUMMY: whether violence happens?)
  - President/Governor's Party (Republican vs. Democratic)

ZIP Models

- Study 1: Decade (control) + Size, Form of Action, SMO, Violence
- Study 2: Decade + President's Party * Governor's Party
- Study 3: Decade + Governor's Party * Policing.

Findings

Study 1: Size of Protest, Form of Action

- Size:
  - Less than 10: tend to decay after day 60
  - 10-1000: tend to diffuse from day 1 to day 60
    - *Large protests consume resources; small protests – difficult to maintain*

- Form of action:
  - Dramaturgical / Institutional / Picketing: tend to decay from day 1 to 60
  - Rally / March tend to decay from day 60 – 90
  - Conflict: tend to decay immediately from day 3 to day 7
    - *Resource Mobilization Theory's Perspective – certain protests are signaling (contagious to others); however certain actions are consuming resources and exhausting other people's change to mobilize.*

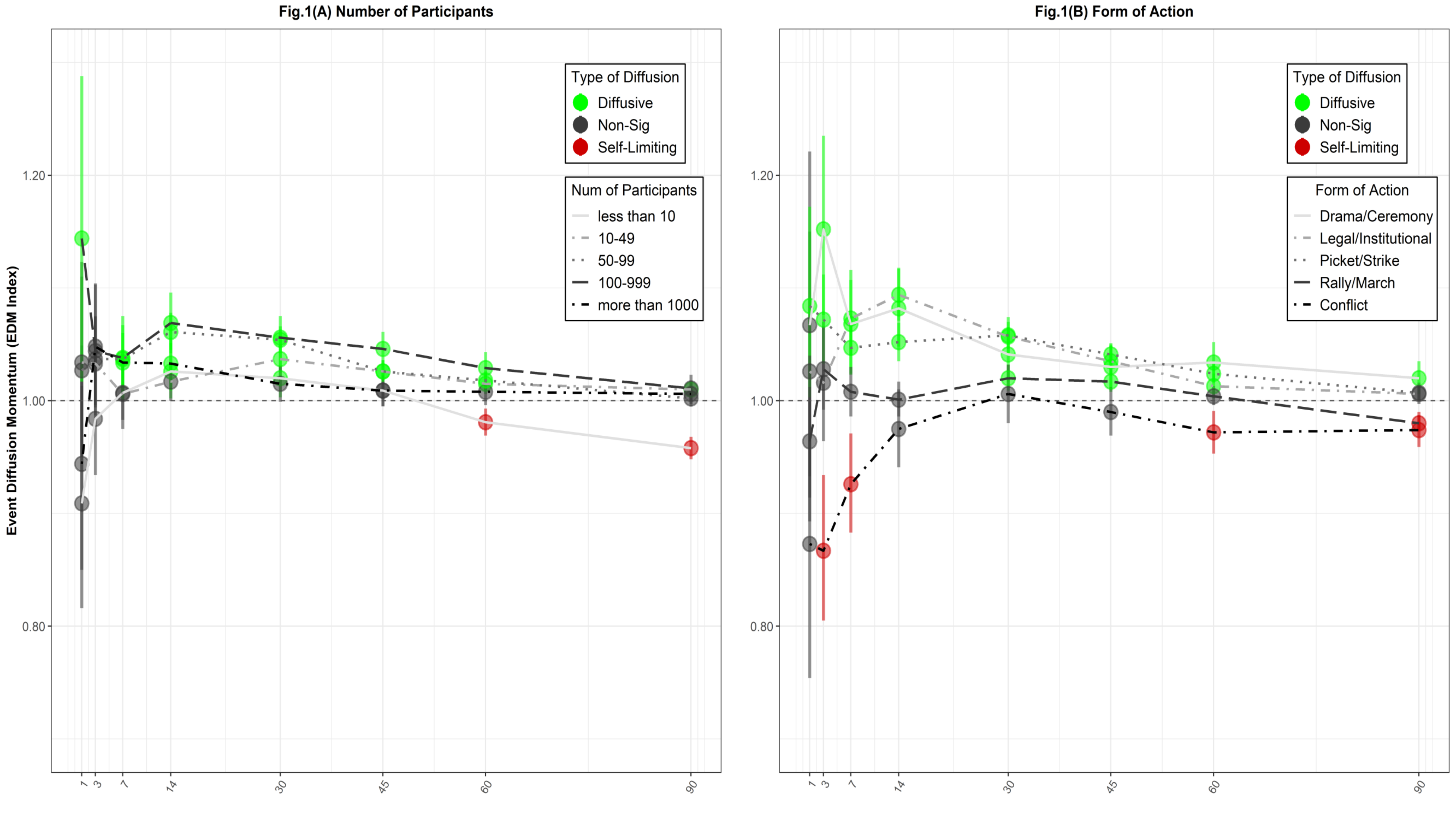


Fig.1(A) Number of Participants
Fig.1(B) Form of Action
Event Diffusion Momentum (EDM Index)
1.20
1.00
0.80
1
3
7
14
30
45
60
90
Type of Diffusion
Diffusive
Non-Sig
Self-Limiting
Num of Participants
less than 10
10-49
50-99
100-999
more than 1000
Form of Action
Drama/Ceremony
Legal/Institutional
Picket/Strike
Rally/March
Conflict

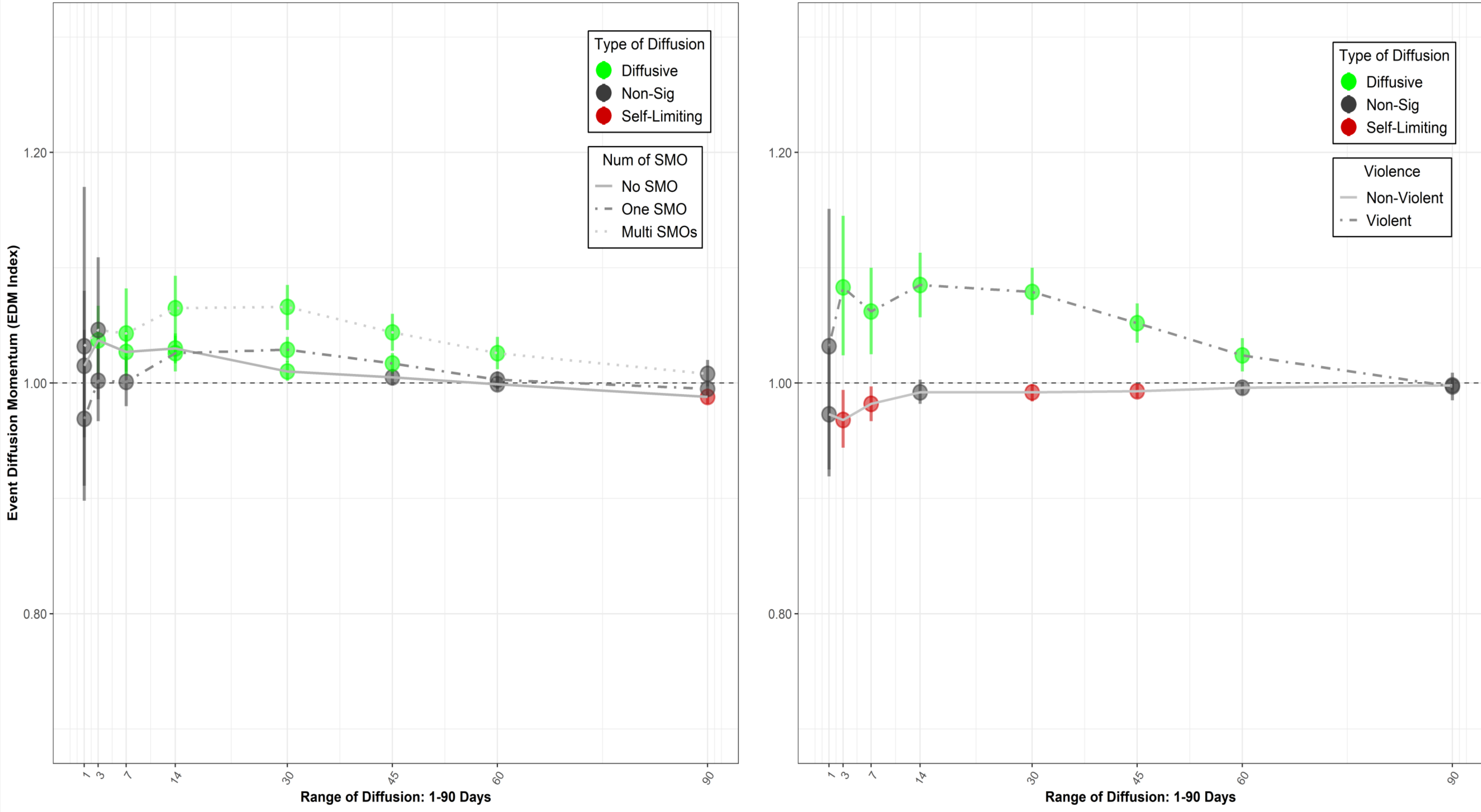
Study 1: SMOs & Violence

- SMOs
  - No SMO – decay after day 90
  - One SMO – diffusive: day 14-45
  - Multi-SMOs – diffusive: day 3-60
    - *Organized actions are more likely to maintain and diffuse.*

- Violence
  - Violent cases are diffusive (day 3-60)
  - Non violent cases are self-limiting (day 3-45)
    - *Violence has the power of provoking emotions (sadness, anger, sympathy)*

Fig.1(C) Number of SMOs involved

Fig.1(D) Violent vs. Non-Violent Protests



Study 2: POTUS & Gov't Party Affiliation

- Democratic POTUS
  - x Democratic Governor (decay after day 90)
  - x Republican Governor (diffuse after day 60)

- Republican POTUS
  - x Democratic Governor (neutral)
  - x Republican Governor (decay after day 45)

- Same party leads to decay; across-party (D-R) leads to diffuse
- "党同伐异"

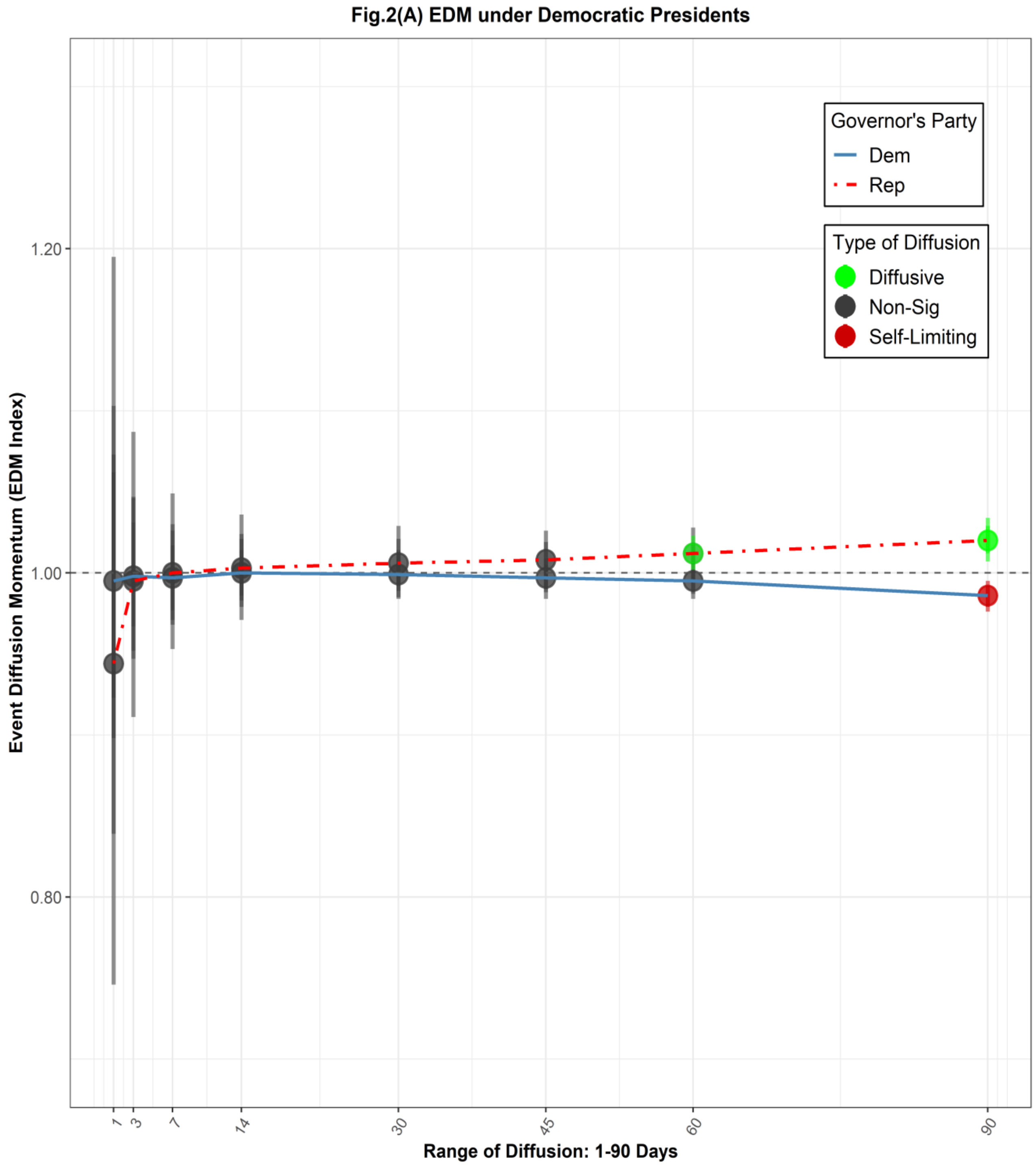


Fig.2(A) EDM under Democratic Presidents
Event Diffusion Momentum (EDM Index)
1.20
1.00
0.80
Governor's Party
Dem
Rep
Type of Diffusion
Diffusive
Non-Sig
Self-Limiting
1
3
7
14
30
45
60
90
Range of Diffusion: 1-90 Days

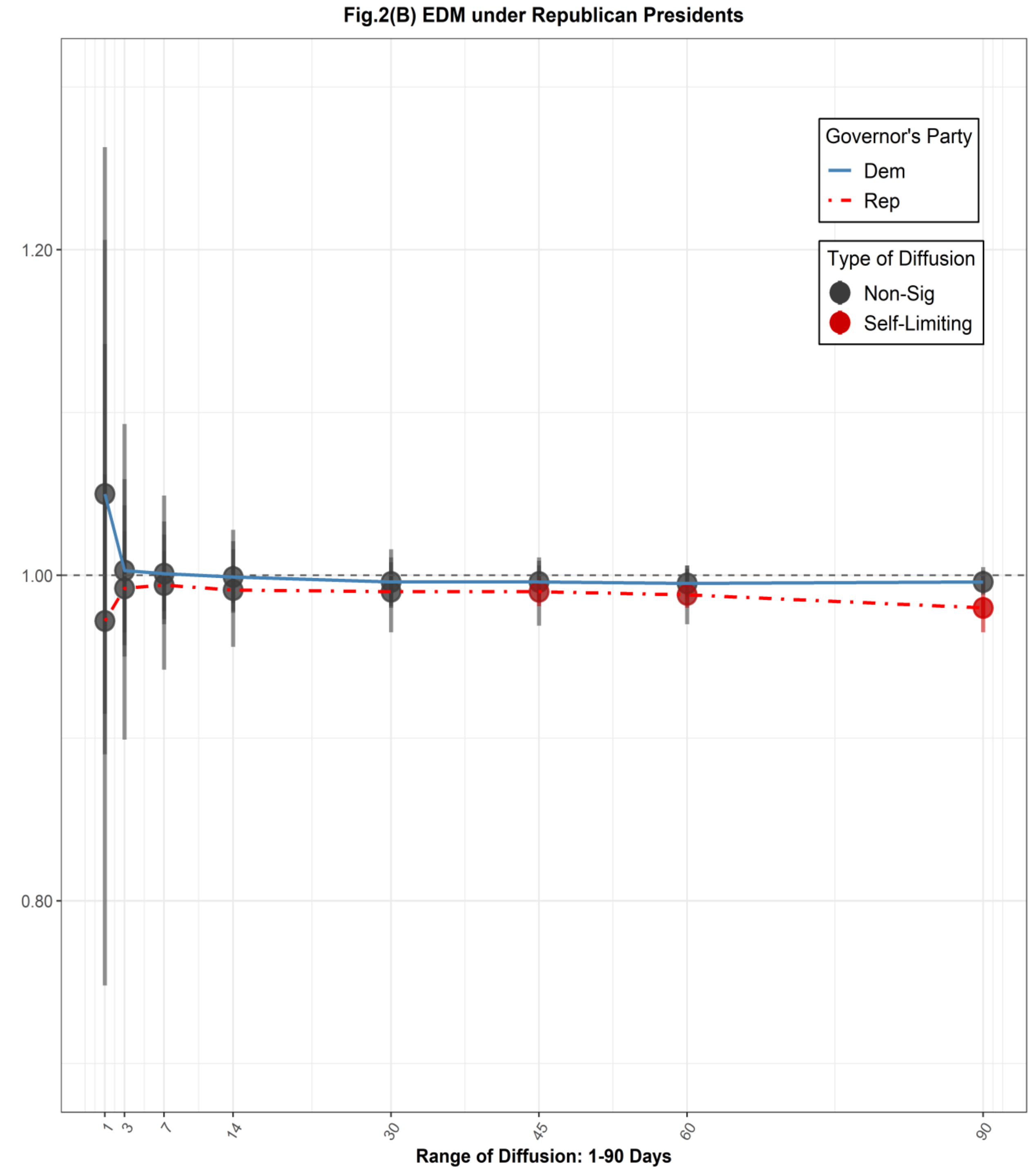


Fig.2(B) EDM under Republican Presidents
1.20
1.00
0.80
Governor's Party
Dem
Rep
Type of Diffusion
Non-Sig
Self-Limiting
1
3
7
14
30
45
60
90
Range of Diffusion: 1-90 Days

Study 3: Gov’t Party Affiliation & Policing

- Democratic Governor
  - x No Policing (decay after day 90)
  - x Policing (no effect)
    - *“Blue states” – fewer guns, more urban/educated population?*

- Republican Governor
  - x No Policing (decay day 30-45)
  - x Policing (diffuse day 30-45)
    - *Maybe this is due to features of “Red States” (more guns, more armed conflicts, more risks/likely to engage in conflicts)*

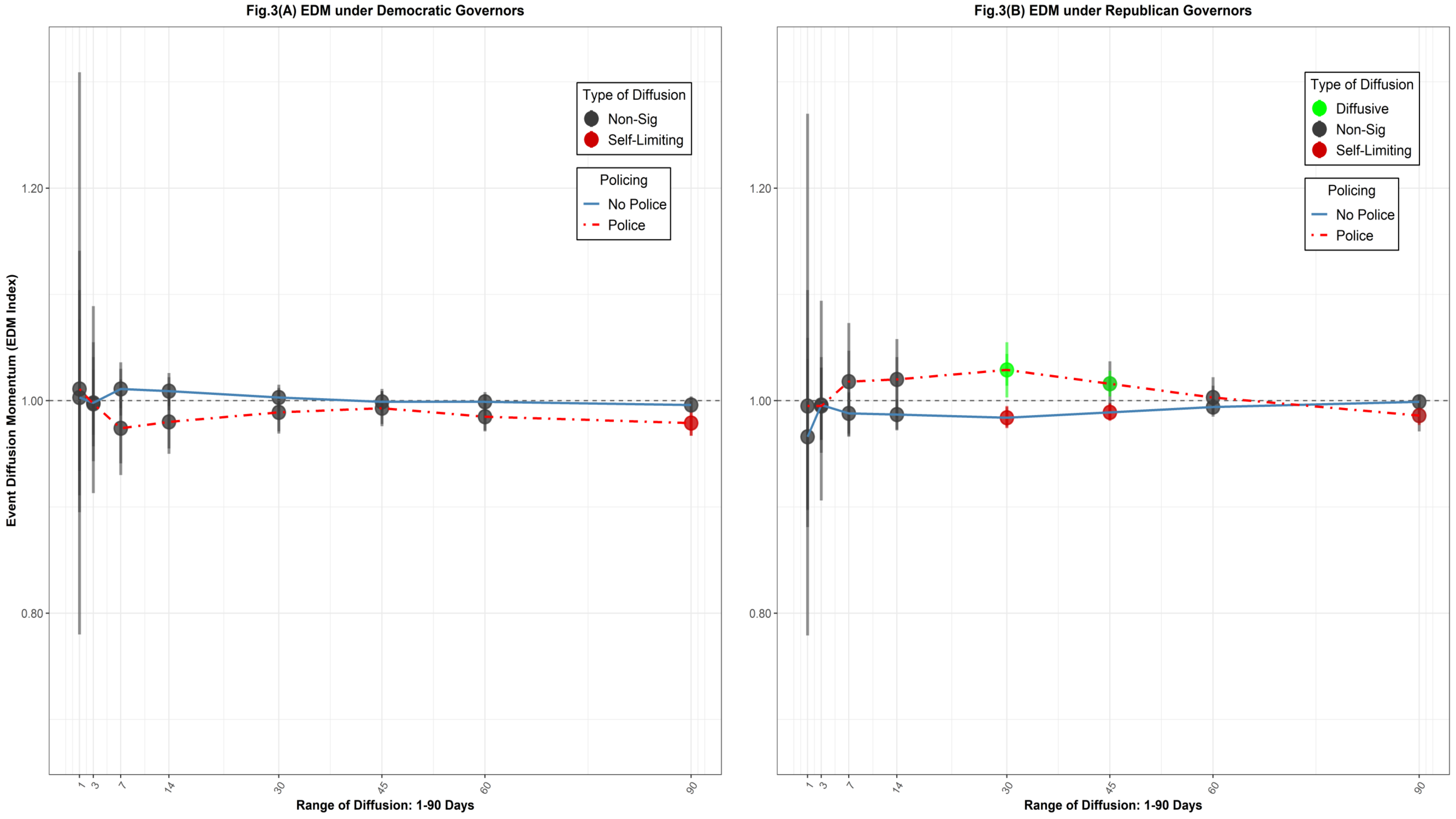


Fig.3(A) EDM under Democratic Governors
Fig.3(B) EDM under Republican Governors
Event Diffusion Momentum (EDM Index)
1.20
1.00
0.80
Type of Diffusion
Diffusive
Non-Sig
Self-Limiting
Policing
No Police
Police
1
3
7
14
30
45
60
90
Range of Diffusion: 1-90 Days

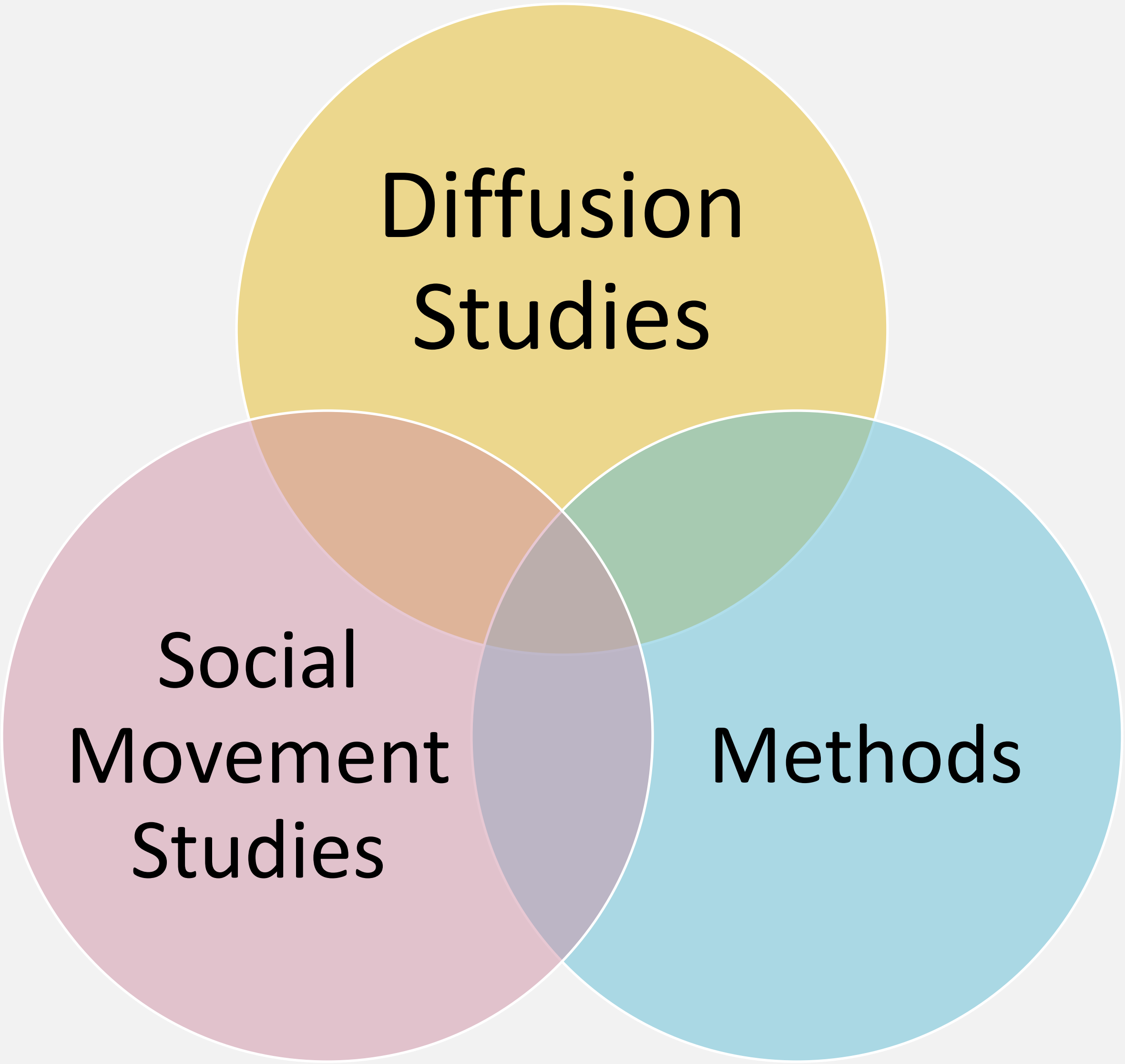
A Summary of Findings

- Study 1
  - Mid-sized protests tend to diffuse.
  - Symbolic actions tend to diffuse.
  - Protests that consume a lot of social resources tend to decay
    - *Large rallies tend to decay; legal, institutional ac*
  - Organized protests tend to diffuse.
  - Violent protests tend to diffuse.
- Study 2
  - Same party leads to decay; opponent parties lead to diffuse.
- Study 3
  - Republican states – policing leads to diffuse, non-policing leads to decay

Discussion and Conclusion

Contributions

- Social Movement Studies / Theoretical & Empirical
  - Identified a few risk factors of protest diffusion, which benefit social movement studies (political opportunity theory, resource mobilization theory)
- Diffusion Studies / Theoretical & Methodological
  - Turning to an inter-event approach and focusing on event's features
  - An approach for understanding non-cumulative events' diffusion
- Methods
  - A five-step method to calculate event diffusion momentum (EDM)
  - Objective, standardized, systematic, avoid researcher's bias
  - Generalizability – can be applied to data with similar structure – events data with temporal/spatial information.


Diffusion
Studies
Social
Movement
Studies
Methods

Limitations and Future Agenda

- Protests were assigned equal weights – shall we see them differently?
  - Can we assume all events have the same impacts in reality and same weights in calculation?
- Long-term social changes – the context of diffusion changed.
  - From Eisenhower to Bill Clinton – can we assume contextual homogeneity? Maybe not.

- A geographical-spatial perspective could be incorporated in the future.
  - State border has its strengths; but what about physical space/distance?
- Data quality
  - Problems of news paper data (Earl et al. 2004 - ARS)
  - Needs more unbiased, comprehensive data - calling for automated generation of big data (Hanna 2017)

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THANKS!

How this project evolves…

- 2016 Idea emerged.
- 2017 Finish programming & analysis.
- 2018 First draft completed.
- 2019 Rejected by a top journal.
- 2020 Redo after discussing with Dr. Cai; another submission & reject by 2 top journals in SOC and POLI-SCI.
- 2021 Submit again (under review at another top-tier journal).
- 2022 Hopefully…

Interesting Issues

- Looping & Vectorized Calculation in R
  - GitHub / StackOverflow Community

- Effects & Matrix Extraction with R
  - “effects” package 2018
  - “margins” package 2019
  - “ggeffects” package 2020
  - “emmeans” package 2021