Become who you are: The Homing Pattern in Partisanship as a Self-reinforcing Stochastic Process

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Outline

Introduction

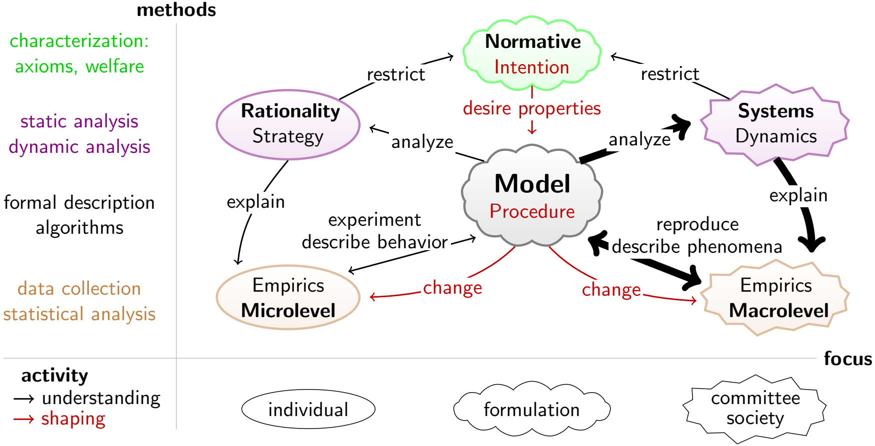
Partisanship

- Voters hold "generalized prior commitment" to support a certain party
- Long-term attachment $\rightarrow$ core of social-psychol. model of voting
- Partisanship is powerful predictor of voting behavior

The homing pattern

- Until 1970s: Partisanship $\approx$ "unmoved mover" of voting behavior
- 1980/90s: Debate: *Identification* vs. *Evaluation* model of Partisanship
- Since 2000s: Long-term panel data for Germany and Great Britain
  - High resolution reveals strong fluctuations $\rightarrow$ Partisanship is "shaky"
  - Voters show a bounded or "homing" pattern:
    1) Subset parties (left–right) and ignore one set
    2) Vary support for their favorite set (homing in, homing out)

Type of research project



Data

The Socio-Economic Panel

- Panel survey of German households, running since 1984
- 9076 individuals (German household head), 3169 (non-German head)
- Tracks individuals and their surrounding households
- Holds German Partisanship question

Our subset

- Time frame 1984-2010
- 965 individuals without missing values → 27 consecutive answers
- All but 14 persons are from German household sample
- Representativeness of subset for SOEP
  - No significant differences for gender
  - Slight differences for political interest education, income and age (e.g. 3182 vs. 2987 DM avg. income)

Items

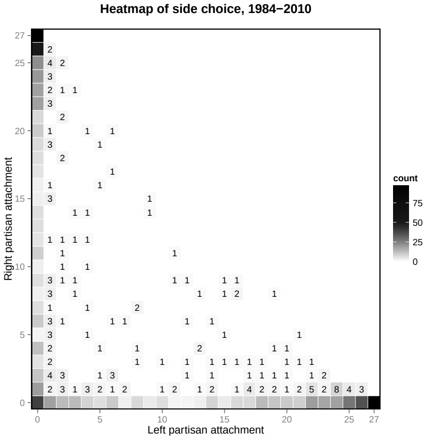
1. Political Interests (very much=1,2,3,4=not at all)
2. **Supports Political Party** (1=Yes, 2=No)
3. **Political Party Supported** (CDU, SPD, Greens, FDP, ...)

Partisanship: Structure in directional choice

100%	**(965)**	**respondents total**			
of which	**21.0%**	**(203)**	**always hold an attachment**		
	of which	38.4%	(78)	with SPD only	
		43.3%	(88)	with CDU/CSU only	
		3.0%	(6)	with FDP only	
		2.5%	(5)	with Greens only	
		12.8%	(26)	shift and name other side (left/right) …	
		o. w.	69.2%	(18)	… never
			19.2%	(5)	… once
			11.5%	(3)	… two or more times
	74.9%	**(723)**	**sometimes hold an attachment**		
	of which	30.7%	(222)	with SPD only	
		30.6%	(221)	with CDU/CSU only	
		1.1%	(8)	with FDP only	
		2.1%	(15)	with Greens only	
		35.5%	(257)	shift and name other side (left/right) …	
		o. w.	33.8%	(87)	… never
			37.0%	(95)	… once
			29.2%	(75)	… two or more times
	4.0%	**(39)**	**never hold an attachment**		

Persistence of attachments

- Allowing for one deviation: 91.7% are directionally stable



Persistence of attachments

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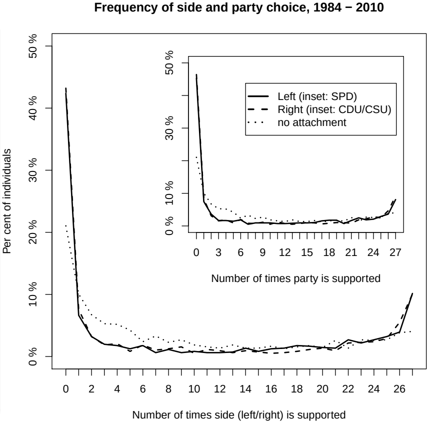
- Many never mention one side → attached to other side
- Large number mentions side (nearly) always → true partisans
- In between: all degrees of loyalty



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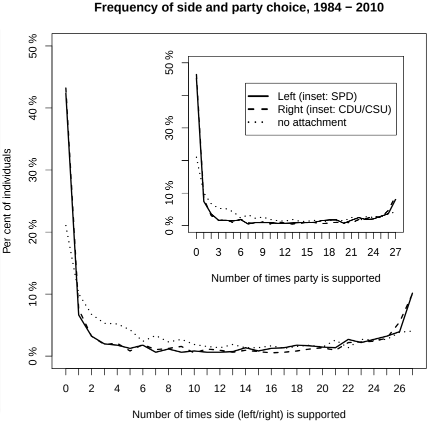
- Choice of party/side is strongly repetitive over time



t / t+1	Indep.	SPD	Union	FDP	Greens
Indep.	0.778	0.097	0.099	0.012	0.013
SPD	0.113	0.860	0.012	0.002	0.012
Union	0.111	0.010	0.867	0.010	0.001
FDP	0.168	0.028	0.096	0.701	0.006
Greens	0.123	0.100	0.009	0.001	0.768

The Model

- Announcing Partisanship $x(t) \in \{0, 1\}$ as stochastic process
- Time t progresses in discreet steps: $t \in \{1, 2, 3, \dots\}$
- Initial probability q of announcing attachment (*political interest*)
- Count of prior announcements: $\bar{x}(t) = \sum_{s=0}^{t} x(s)$ with $\bar{x}(0) = 0$
- Probability of announcement $p = p(t, \bar{x}(t)) = (\bar{x}(t) + q)/(t + 1)$,

  thus, $x(t+1) = \begin{cases} 1 & \text{with probability } p(t, \bar{x}(t)), \\ 0 & \text{else.} \end{cases}$
- Distribution of announcements → time-dependent Markov-chain

- Over time, impact of q declines → personal partisan history takes over
- Unfolding is driven by two competing forces:
  - Strengthening: Attachment → increased probability to announce again
  - Erosion: No attachment → probability to announce declines
- Direction and announcement treated as separate elements: Direction = constant, Announcement = stochastic process

Example run for q=0.5

Data	Year	1984	1985	1986	1987	1988	1989	1990
	Partisanship	Yes	No	Yes	Yes	No	Yes	Yes
Model with $q = 0.5$	t	1	2	3	4	5	6	7
	History of Partisanship up to $t-1$	none	1	1 0	1 0 1	1 0 1 1	1 0 1 1 0	1 0 1 1 0 1
	$\bar{x}(t-1)$	0	1	1	2	3	3	4
	$p(t-1)$	0.50	0.75	0.50	0.63	0.70	0.58	0.64
		by random draw with probability $p(t-1)$						
	$x(t)$	1	0	1	1	0	1	1

Deriving the Markov chain

Probability of announcement (1)

$$x(t+1) = \begin{cases} 1 & \text{with probability } p(t, \bar{x}(t)), \\ 0 & \text{else.} \end{cases}$$

Since each step depends on the full history of announcements (via $\bar{x}(t)$), it is not yet a Markov-process.

Recasting to probability of increasing history of announcements (2)

$$\bar{x}(t+1) = \begin{cases} \bar{x}(t) + 1 & \text{with probability } p(t, \bar{x}(t)), \\ \bar{x}(t) & \text{else.} \end{cases}$$

The new sum of announcements depends only on the sum of announcements so far and the current round. Thus, it is Markovian.

Probability mass function F(t)

To hold the histogram of announcements, we define the probability mass function $F(t) = [F_0, F_1, \ldots, F_{\bar{x}}, \ldots, F_{t_{max}}]$.

- $\bar{x}$ indexes number of announcements
- $F_{\bar{x}}(t) \in [0, 1]$ holds the relative frequency of announcements at t
- Obviously: $\sum_{\bar{x}=0}^{t_{max}} F_{\bar{x}}(t) = 1$, and: $F_{\bar{x}}(t) = 0$ whenever $\bar{x} > t$

The dynamic equation of F can be defined as $F(t+1) = F(t)T(t)$ with $T(t)$ denoting the Markov transition matrix from (2)

The transition probabilities for $T(t)$ can be written as:

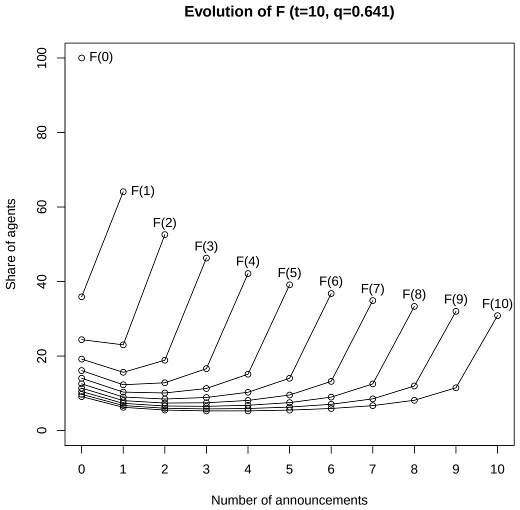
$$T_{\bar{x},\bar{x}+1}(t) = \begin{cases} p(t,\bar{x}) = \frac{\bar{x}+q}{t+1} & \text{when } \bar{x} \le t, \\ 0 & \text{otherwise,} \end{cases}$$

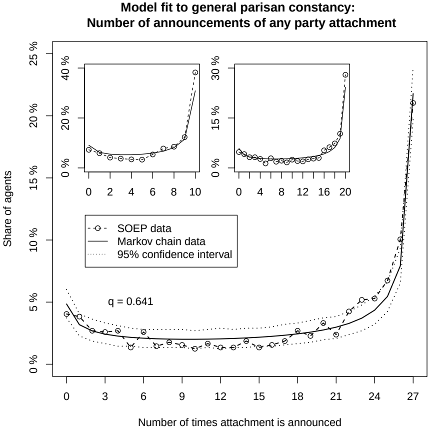
$$T_{\bar{x},\bar{x}}(t) = \begin{cases} 1 - p(t,\bar{x}) = \frac{t+1-\bar{x}-q}{t+1} & \text{when } \bar{x} \le t, \\ 1 & \text{otherwise.} \end{cases}$$

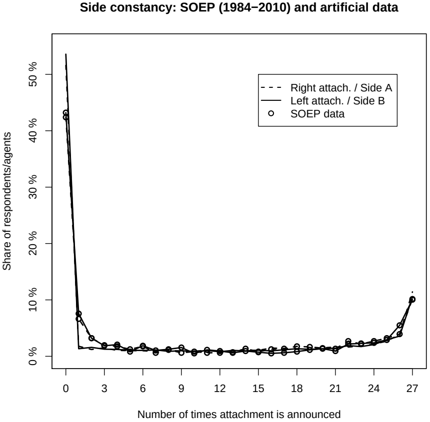
$\bar{x}$ can only increase by one or stay the same, so the other entires are zero.

$$\text{Example for } T(2) = \begin{bmatrix} \frac{3-q}{3} & \frac{q}{3} & 0 & \cdots & & & \\ 0 & \frac{2-q}{3} & \frac{1+q}{3} & \ddots & & & \\ \vdots & \ddots & \frac{1-q}{3} & \frac{2+q}{3} & & & \\ & & & 1 & 0 & & \\ & & & & \ddots & \ddots & \end{bmatrix}$$

Example evolution of F:

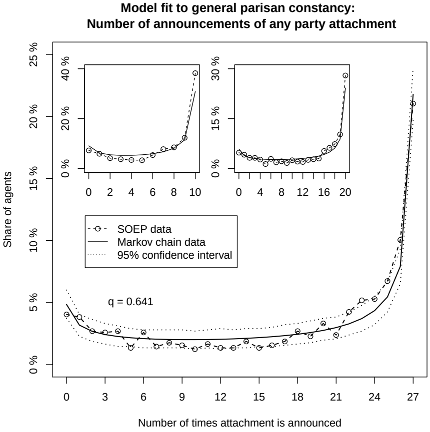


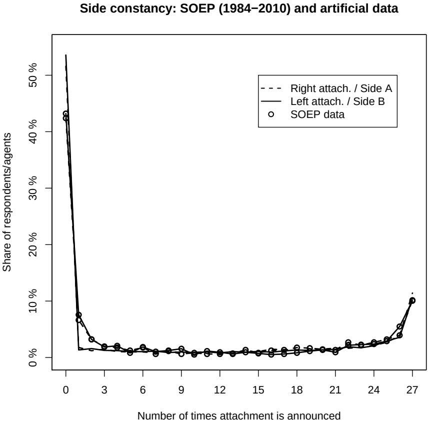




Estimation of q and Fitting

- Aggregate distribution from Markov chain was fitted via least squares
- Estimated $q = 0.641$ informed agent-based model to generate micro data (Agents randomly assigned Side A : Side B = 1:1)



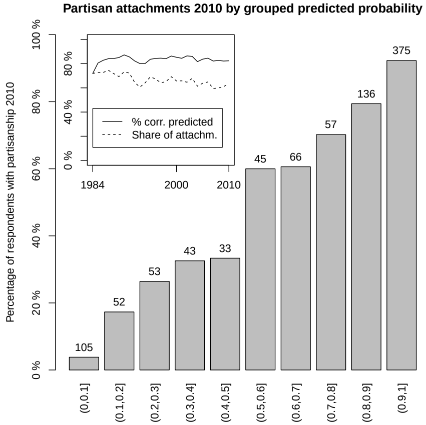


Artificial: 5000 agents, q = 0.641, A:B = 1:1

t / t+1	no PID	Side A	Side B
no PID	0.682	0.155	0.162
Side A	0.180	0.820	0.000
Side B	0.178	0.000	0.822

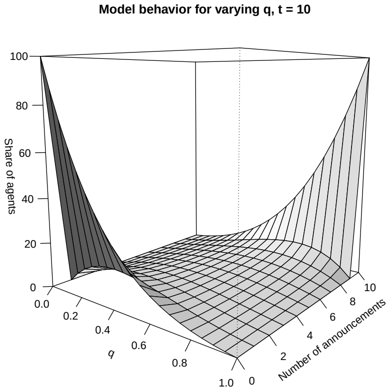
USA, 1992-1996 (Bartels et al. 2011)

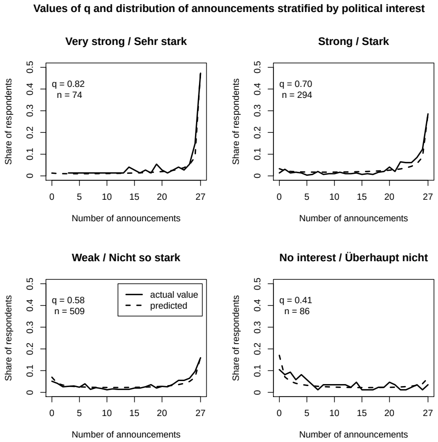
t / t+1	Indep.	Rep.	Dem.
Indep.	0.703	0.137	0.160
Rep.	0.140	0.837	0.023
Dem.	0.129	0.024	0.847



Prediction ($q = 0.641$)

- Predicted attachment from SOEP 1984-2009: 82.4% correct
- Slight deviation: Simulated attachments somewhat less “sticky” than real ones





Model analysis ($q = 0.641, t_{max} = 10$)

- Declining $q \Rightarrow$ number of stably attached partisans drops quickly
- Model extension:
  Stratification of dataset $\Rightarrow q$ is linearly related to political interest

Discussion and Conclusion

Our model may inform several debates on Partisanship

- Type of underlying model
  - Partisanship is twofold: direction (stable) and salience (dynamic)
  - Former aspect fits identification, latter evaluation model (learning!)
- Are leaners partisans?
  - Partisan leaners → temporary lapse of attachment as explanation?
- Measurement error
  - Latent construct concept of attachment fits, but not white noise disturbance
- Multiple types of voters?
  - Wide array of partisan trajectories from single process → no need to drop assumption that one type fits most of the phenomena on aggregate level