Theory

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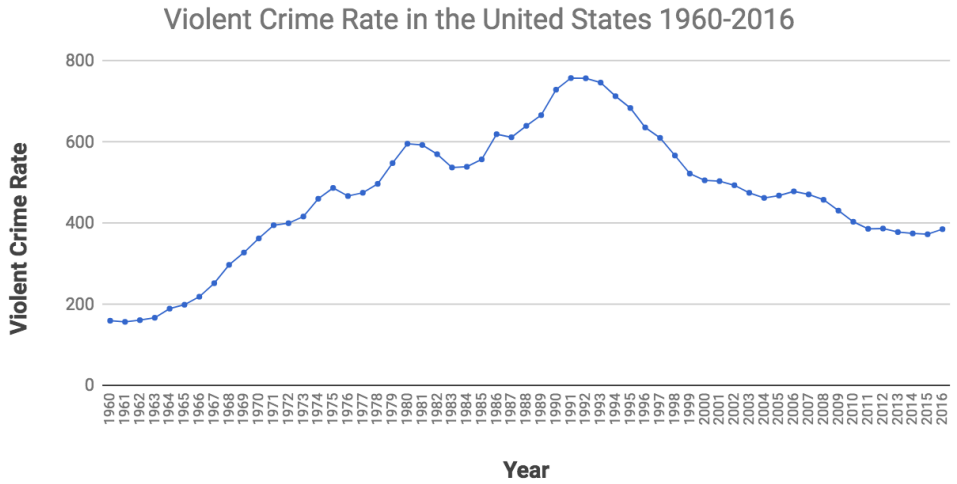
Introduction

- We are interested in *causal* mechanisms.
- That is, we would like to know whether $X \rightarrow Y$.
- Theory helps us to explain *why* X might be affecting Y and helps us rule out spurious associations.

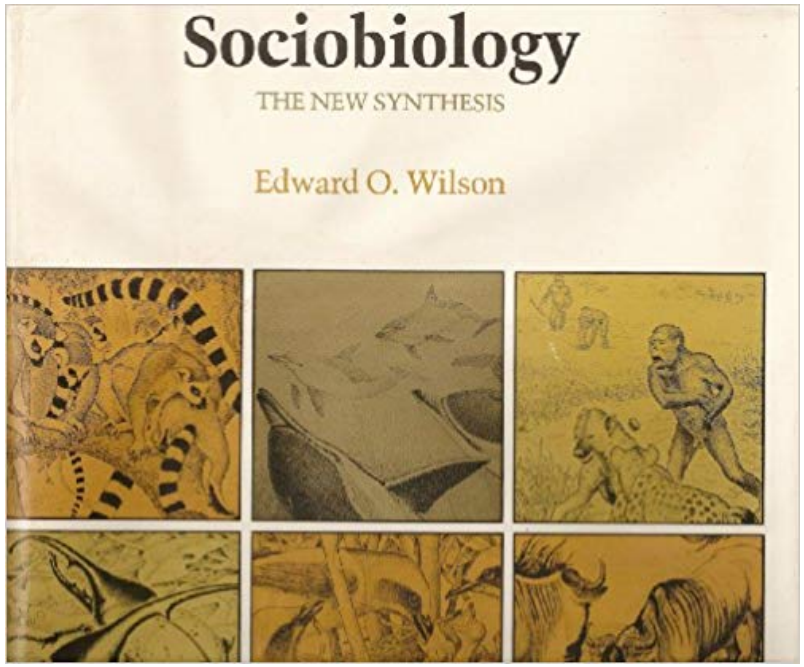
What is theory?

- Set of principles that are, general, causal, and testable



Notable theories in political science

- Rational choice theory
- Behavioralism
- Evolutionary biology



Application 1: Prisoners' Dilemma

Assumptions:

- Players' preferences and payoffs are known
- Individuals make choices that maximize their expected utility
- Information is perfect

		Player 2	
		Cooperate	Defect
Player 1	Cooperate	(2, 2)	(1, 3)
	Defect	(3, 1)	(0, 0)

Application 2: Political socialization

Assumptions:

- Individuals learn from their social settings, particularly as children.
- Individuals form group attachments, the psychological benefit of which may override one's own self-interest.

	Fundamentalist	Evangelical	Mainline	Liberal
Democrat	31%	38%	44%	59%
Independent	16%	9%	11%	11%
Republican	53%	53%	45%	31%

Source: General Social Survey (1998). Respondents all self-identify as Protestants. $N = 774$.

Application 3: Evolution

Assumptions:

- Genes mutate and evolve, and some of these genes are relevant to social behavior.
- Genetic traits that aid in survival are more likely to be passed to subsequent generations.

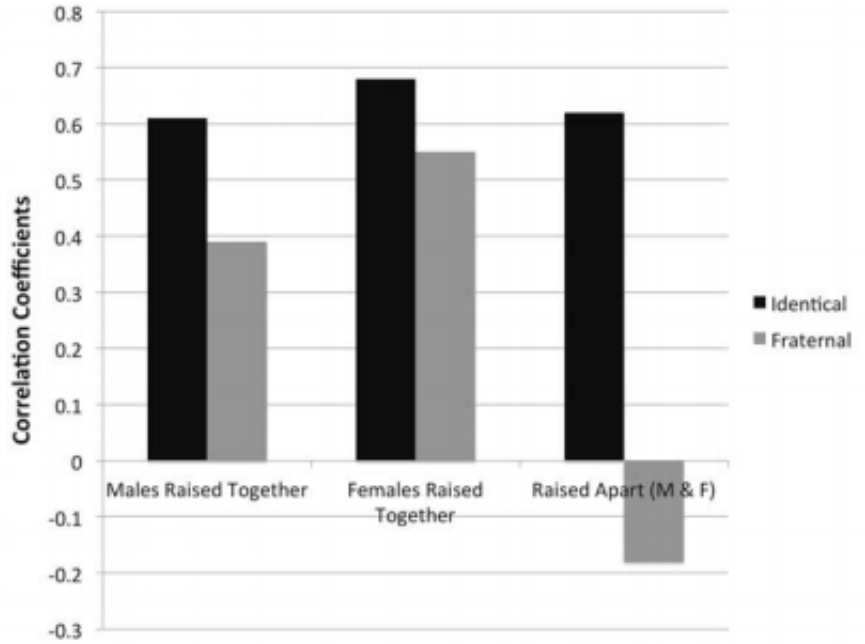


Figure 1. Correlations between the Political Orientations of Identical and Fraternal Twins, Raised Together and Apart.

Recap

- Theories are a set of broad, general propositions.
- In the social sciences, these propositions largely relate to human behavior.
- Theories give rise to specific hypotheses.

Positive political theory (rational choice, game theory, etc.)

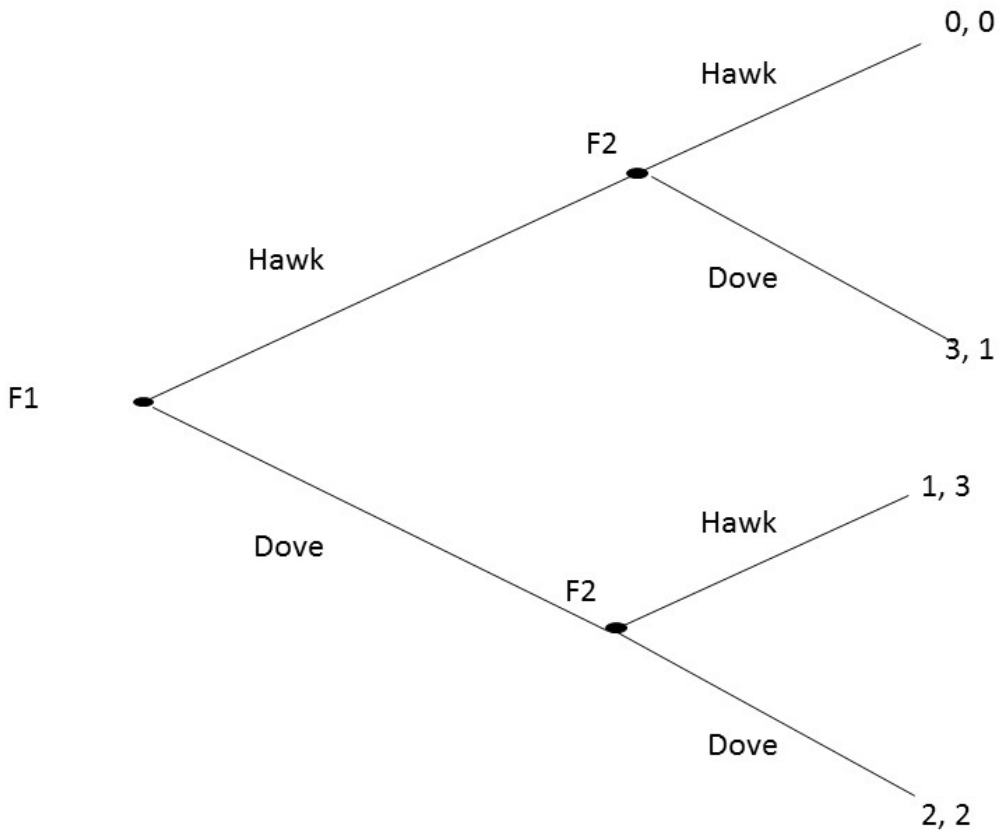
- The dominant theoretical paradigm in political science.
- Basic assumptions:
  - We know who is playing the game: $i \in N$.
  - The players know what actions they can take, A_i.
  - Actions are mapped into payoffs, U_i.
  - Players have preferences over those payoffs with a certain degree of certainty, $\omega(U_i)$.
  - Common knowledge
- With these assumptions, every game has at least one Nash Equilibrium.

Civil war

- Suppose two factions within a state compete for the same resources. The two factions can either choose to behave like a hawk or a dove, where hawks will fight over the resource to the point of exterminating a fellow hawk and/or take a majority of the resources from a dove. Two doves share the resource equally.
- Let the following table represent players, actions, and payoffs, where we assume each player prefers the highest payoff possible. Let the first listed payoff be assigned to Faction 1 and the second listed payoff be assigned to Faction 2.
- Find all of the Nash Equilibria.

		Faction 2	
		Hawk	Dove
Faction 1	Hawk	(0, 0)	(3, 1)
	Dove	(1, 3)	(2, 2)

Hawks and doves with sequence

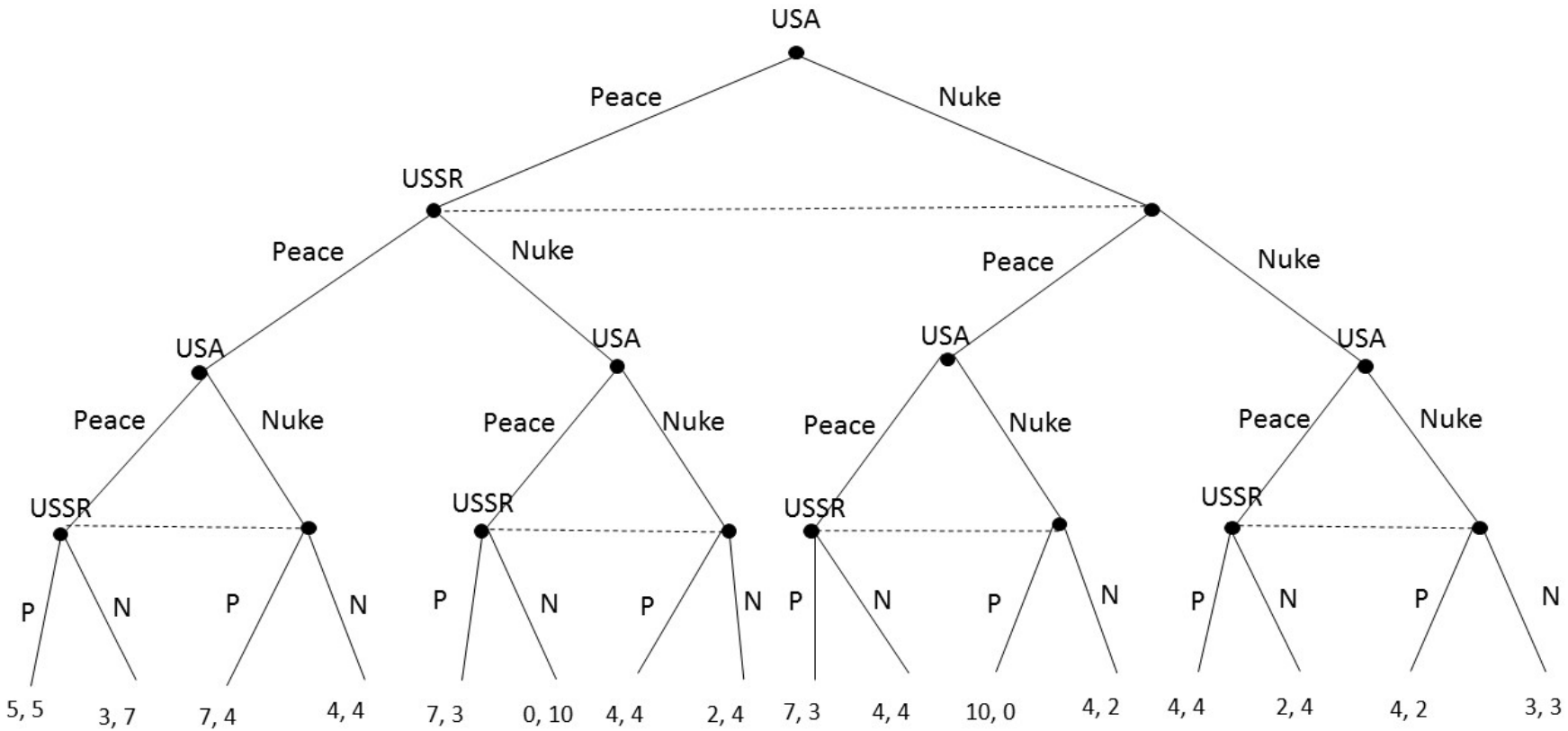


The Cuban missile crisis

- Two players, USA and USSR
- Each player can either choose to keep the peace or to drop a nuclear bomb on their foe.
- Players prefer to do the nuking as opposed to getting nuked, but if they are to get nuked, they'd rather respond in kind before they are wiped off the map.
- What outcome does a Nash Equilibrium anticipate?

		USSR	
		Peace	Nuke
USA	Peace	(2, 2)	(0, 3)
	Nuke	(3, 0)	(1, 1)

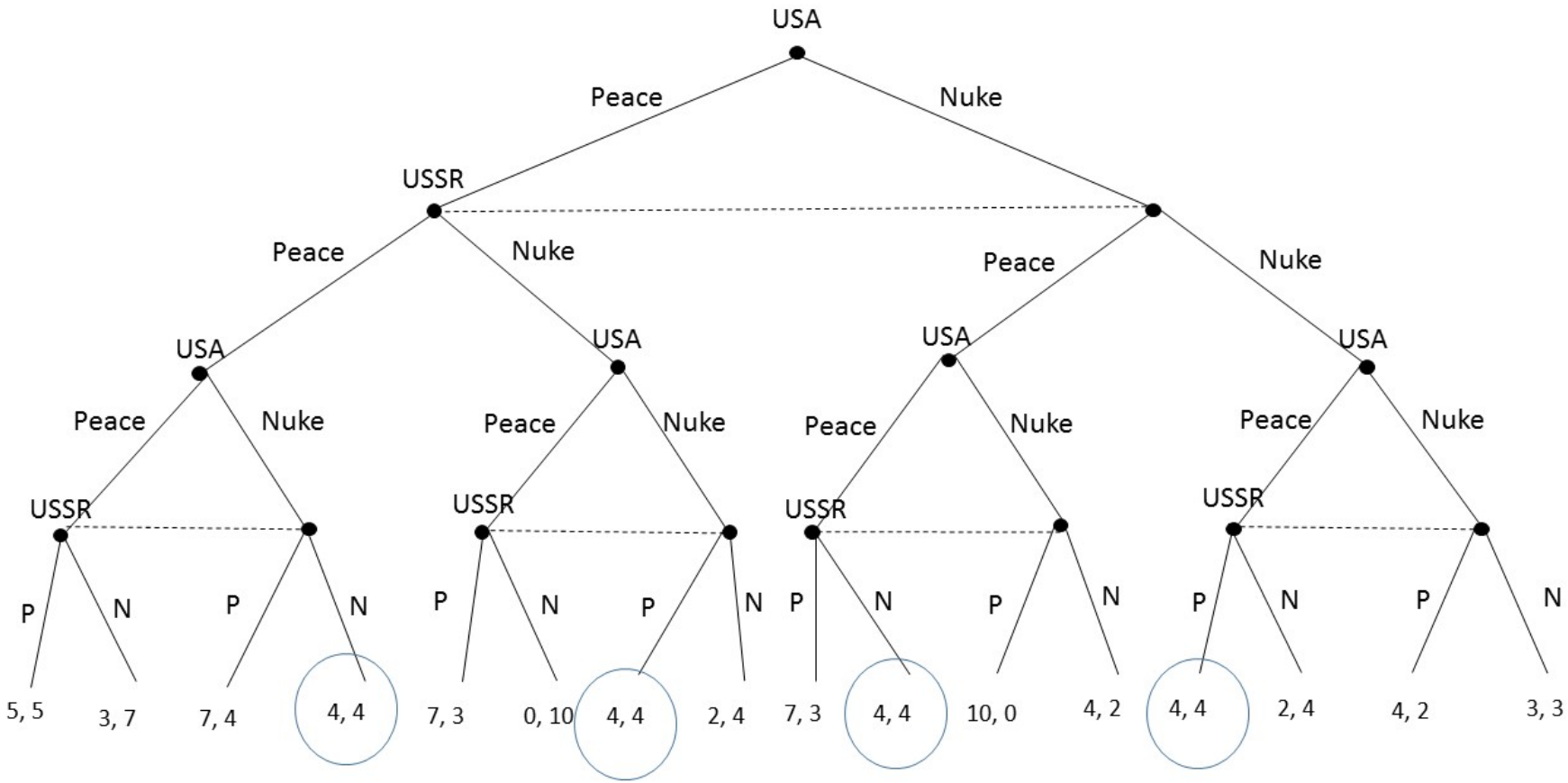
The Cuban missile crisis as a repeated game



The Cuban missile crisis as a repeated game

		USSR			
		PP	PN	NP	NN
USA	PP	(5, 5)	(3, 7)	(3, 7)	(0, 10)
	PN	(7, 4)	(4, 4)	(4, 4)	(2, 4)
	NP	(7, 4)	(4, 4)	(4, 4)	(2, 4)
	NN	(10, 0)	(4, 2)	(4, 2)	(3, 3)

The Cuban missile crisis as a repeated game



Voting in elections

- Players: Candidate A, Candidate B, and a population of voters, $V = \infty$.
- Actions: Candidates choose a platform, $x \in \Re$, and voters choose between the two candidates, $a_v = \{A, B\}$.
- Preferences: Candidates prefer to win. Voters prefer to vote for the candidate that best reflects their preferences.
- Payoffs: Candidates receive a payoff of "1" if they win, "0" otherwise. Voters receive $U_i(x) = -(\theta_v - x)^2$, where θ_v represents each voter's preferred outcome, and the distribution of each voter's preferences are single-peaked and symmetric.
- What's the outcome? Is this realistic?

Applications to your research

- Who are the players?
- What are their preferences?
- What available actions may they take?

Conclusion

- There are an endless number of applications for these three major theories–voter behavior, international relations, etc.
- As political scientists, we accumulate evidence in an a continued effort to test theoretical assumptions about political phenomena.