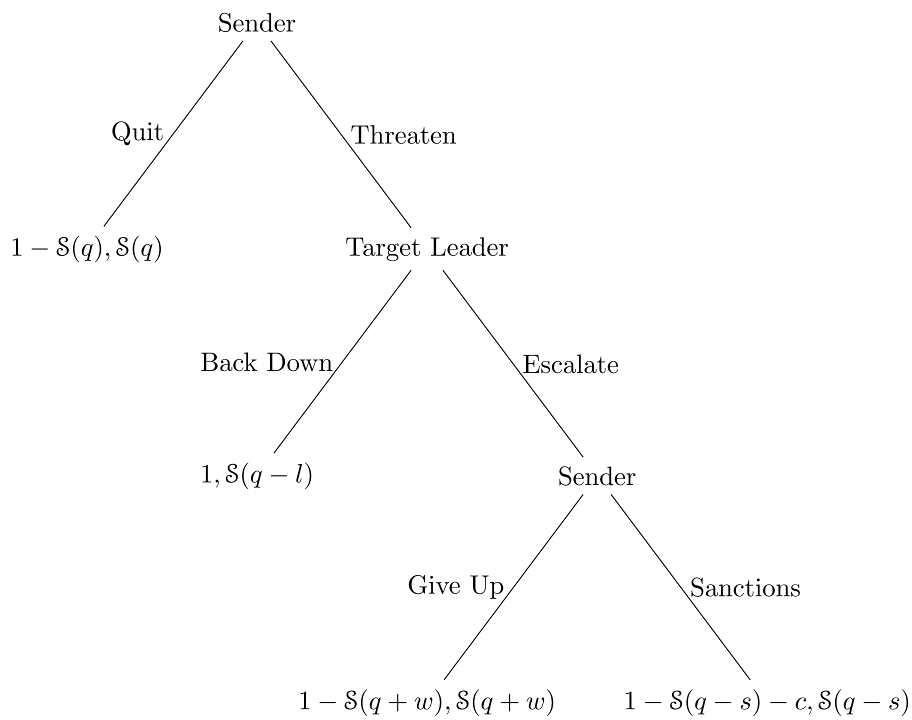
Selection Problems and Issue Linkage

Due Beginning of Class October 31, 2017

Group Work Encouraged, But Write Up Must Be One's Own

No Late Work Accepted

1) Consider the following sanctions game:



The interaction is as follows. The sender state dislikes a policy that the target leader has implemented and wants change. It is considering sanctioning the leader to convince the leader to give up the policy or foment a domestic uprising against the leader.

Meanwhile, the leader simply wants to stay in office. As such, the target leader's payoffs are the probabilities he stays in office. Thus, if the sender quits without issuing a threat, the leader stays in power with probability $\mathcal{S}(q)$, with q reflecting the status **Q**uo. If the sender issues a threat and the target backs down, he stays in power with probability $\mathcal{S}(q-l)$, with l reflecting the leader's **L**oss in the crisis. If the sender issues a threat, the leader escalates, and the sender gives up, the leader stays in power with probability $\mathcal{S}(q+w)$, with w reflecting the leader's **W**in in the crisis. Finally, sanctions occur, the leader stays in power with probability $\mathcal{S}(q - s)$, with s reflecting the **S**anction's effectiveness.

The sender's payoffs are more complicated. If the leader backs down, the sender earns 1, reflecting how it achieves its aims. For the remaining outcomes, the sender can only obtain its goals if the leader loses power. As such, its payoffs in those cases are the probability the leader loses office. Additionally, the sender pays a cost c if it imposes sanctions so as to reflect the loss of trade efficiency.

a) Let $\mathcal{S}(q) = .72$, $\mathcal{S}(q - l) = .52$, $\mathcal{S}(q + w) = .82$, $\mathcal{S}(q - s) = .7$, and $c = .05$. (It may help to redraw the game tree with these payoffs explicitly written in.) What is the outcome of this game? Explain your answer.

b) Now suppose sanctions are more likely to cause the leader's removal, i.e., $\mathcal{S}(q - s) = .53$. Hold all other parameters at the same values as before. What is the outcome of this game? Explain your answer.

c) Now suppose sanctions are yet more likely to cause the leader's removal, i.e., $\mathcal{S}(q - s) = .32$. Hold all other parameters at the same values as before. What is the outcome of this game? Explain your answer.

d) Using the answers from above, explain why the sanctions we observe are not the most effective sanctions in principle. In answering this question, make sure to explain the strategic logic of why we fail to observe the most effective sanctions in practice.

2) Later in the course, we will learn about how terrorist groups commit higher levels of violence when there are multiple groups competing for donations and manpower. This question explores how such competition can cause a selection problem.

a) Suppose a single terrorist group exists. Committing violence publicizes it as "the" group for extremist sympathizers to support. Imagine that the pool of extremist sympathizers is worth a value of 1. The group has three options: commit no attack, commit a low-level attack at cost .2 to the group, or commit a high-level attack at cost .4. If the group commits any kind of attack, it will capture the entire pool of sympathizers; it captures none of the pool if it commits no attack. What strategy should the terrorist group choose?

b) Suppose now two terrorist groups exist. The pool remains fixed at 1, and each can choose no attack, a low-level attack, or a high-level attack. The costs of each possible attack remain the same as before. However, how the sympathizers disperse among the groups is different. If neither group commits an attack, then both receive no support. If both groups select the same amount of violence, they evenly split the sympathizers. If one commits more violence than the other, then the more violent group receives *all* of the sympathizers. We can condense that information down into the following matrix:

	None	Low	High
None	$0, 0$	$0, .8$	$0, .6$
Low	$.8, 0$	$.3, .3$	$0, .6$
High	$.6, 0$	$.6, 0$	$.1, .1$

What should each group do? What game does this remind you of?

c) Suppose a government is deciding whether to take back control of a breakaway republic. The government knows the operation will be successful, and it values control worth 2. However, the government also knows that such an action will radicalize a population. This worries the government, because each low-level attack costs the government .75 in suffering and each high-level attack costs the government 1.5 in suffering. Thus, the government's overall payoff for taking back control is 2 minus whatever costs it suffers. Meanwhile, suppose the government values inaction worth 0; this is because it will not capture that value of 2 and it also won't suffer any terrorist attacks because it has not radicalized the population.

Imagine that only one terrorist group exists that has preferences described in part (a). The government begins by first choosing whether to take back control or not, and the terrorist group chooses whether to commit an attack if the government does. Based on your answer for part (a), what should the government do? Why?

d) Now imagine that two terrorist groups exist, each with preferences as described in part (b). Based on your answer for part (b), what should the government do? Why?

e) A policymaker in Washington collects data on the number of terrorist groups in every region of the world and the number of attacks in each region. She finds that regions with more terrorist groups experience less violence. Based on this, she instructs the Department of Defense that the United States does not need to exercise as much caution in areas where there are a lot of terrorist groups. Comment on this recommendation.

3) Recall that one way international institutions can promote cooperation is by linking multiple issues together. This question verifies that intuition using a repeated prisoner's dilemma.

a) Consider the prisoner's dilemma below:

	Left	Right
Up	$4, 3$	$-1, 5$
Down	$5, -1$	$0, 0$

Let the probability the game continues to the next iteration be p. What is the minimum value of p necessary for the players to sustain mutual cooperation? (To answer this question, find the minimum value of p necessary for player 1 to be willing to sustain cooperation. Then find the minimum value of p necessary for player 2 to be willing to sustain cooperation. The answer is the *maximum* of these two values.)

b) Consider the prisoner's dilemma below:

	Left	Right
Up	$3, 4$	$-1, 5$
Down	$5, -1$	$0, 0$

Again, let the probability the game continues to the next iteration be p. What is the minimum value of p necessary for the players to sustain mutual cooperation?

c) Consider the prisoner's dilemma below:

	Left	Right
Up	$7, 7$	$-2, 10$
Down	$10, -2$	$0, 0$

Once more, let the probability the game continues to the next iteration be p. What is the minimum value of p necessary for the players to sustain mutual cooperation?

d) Note that the game in part c is the summation of the games from parts a and b. In essence, the game ties cooperation decisions on the issue from part a together with cooperation decisions on the issue from part b. Suppose $p = .4$. Are the players better off keeping the issues separate or tying them together?

e) Suppose the institution is costly to create—i.e., bundling the issues together costs each state c to pay for coordination bureaucracy. If $p = .4$, what is the maximum value of c the states would be willing to pay to create the institution?