Game Theory and International Relations 'Isms

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Neorealism and neoliberal institutionalism tend to have different understandings about what the underlying "games" are that characterize international conflict and cooperation. As such, game theory can be a precise and clear way to direct our attention to the main points of contention between these different theoretical approaches. Consider, for instance, neorealism, that puts heavy emphasis on the concept of relative gains. Neorealists generally argue that any gain to one country increases the threat felt by other countries, given that it affects the relative balance of power between the two. This is true of military resources, and of economic resources, as neorealists (like Mearsheimer) note that economic resources can be transformed into military or security resources such that they also confer balance of power advantages to the country with greater resources. Thus, insofar as security/military concerns dominate, the situation looks like a zero sum game, as with the one below.

		Country 2	
		A	B
Country 1	A	$1, -1$	$-1, 1$
	B	$-1, 1$	$1, -1$

In the above matrix, the first element refers to the payoff to country 1 and the second element refers to the payoff to country 2. These define a ranking of different outcomes for each country: in this case, for instance, country 1's rank order is $(A, A) = (B, B) > (B, A) = (A, B)$. Note that with zero sum games, there is no possibility of gaining from cooperation, as one party's gain is the other's loss. Most competitive games (from chess to football) could be described as having this structure.

Neoliberal institutionalists accept many of the postulates of neorealists, including anarchy and the rational self-interest of states, but they do not assume that every situation in international politics is fundamentally a zero sum game. Instead, they discuss games like the following "harmony" game.

		Country 2	
		A	B
Country 1	A	$1, 1$	$-1, -1$
	B	$-1, -1$	$-2, -2$

In the above game, each country's best option is to choose A irrespective of what the other player does. Given that, institutions are not necessary to support cooperation, as cooperation arises naturally from each country's independent incentives. For a silly example, neighbours in an apartment don't need to come up with complex agreements to cooperate on not setting fire to their own apartments, as neither party wants to do that anyways. Other games may involve coordination, as with the following two:

		Country 2	
		A	B
Country 1	A	$1,1$	$0,0$
	B	$0,0$	$1,1$

		Country 2	
		A	B
Country 1	A	$1,2$	$0,0$
	B	$0,0$	$2,1$

In both of the above, each country wants to end up at the same outcome (i.e. (A, A) or (B, B)). In the first one, neither party cares which they end up at. In the second, country 1 prefers (B, B) and country 2 prefers (A, A), so there is some scope for disagreement about which of these two options they end up at. Neoliberal institutionalists argue that institutions are great for solving the cooperation problems these kinds of games represent. They argue institutions can do this my ensuring that both parties know which equilibrium they are coordinating on, and also providing a forum in which parties can bargain between the cooperative outcomes. The example used in class is coordination over communications technology: everyone would prefer that both parties have the same technology (e.g. telephone or telegraph) but each party may have preferences over which outcome they end up at, creating scope for disagreement and bargaining.

The last, arguably most important kind of game is the famous Prisoner's Dilemma.

		Country 2	
		A	B
Country 1	A	$-3,-3$	$-20,-0$
	B	$0,-20$	$-6,-6$

As we've discussed in class, in this game each country wants to choose B no matter what the other player chooses, such that the outcome is (B, B), which is strictly worse for both countries than (A, A). If possible, the countries would prefer to get to (A, A), but how they do that without some external body to force them to choose (A, A) is a trickier question. Examples of situations that arguably have similar structures to the prisoner's dilemma include the security dilemma (where both parties would prefer that neither party have any military troops, but they build them up because it's in each party's interest to have a military), climate change (each party prefers the world without excessive greenhouse gas emissions to the world where greenhouse gas emissions are excessive, but it's in each individual country's interest to pollute), and cartel formation (each party prefers when prices are higher, but has an individual incentive to charge a lower price to get a greater share of the market). Neoliberal institutionalists argue that institutions can help by allowing states to build reputations for cooperating, such that long term gains can convince them not to "cheat" or "defect" in

the short term.

Important to this argument is work by Robert Axelrod on The Evolution of Cooperation that demonstrated that states can benefit in situations of repeated interaction by engaging in "tit for tat", whereby they cooperate until someone else does not, in which case they "punish" the other player by not cooperating for a turn, and then go back to cooperating.[1]

Lastly, constructivists argue that situations aren't naturaly endowed with a particular inevitable game structure by way of the structure of the international system (e.g. anarchy). Instead, they suggest the game structure is socially constructed as part of the process of interaction. For instance, perhaps a situation that started out as a zero sum game can become a prisoner's dilemma, and then eventually even a harmony game. One example of this might be conflict between France and Germany. Before World War 2, their interests were inherently conflictual, but now common perceptions of a European identity may make it so that war between them is unthinkable, and what's good for one country may also naturally be good for the other country.

In conclusion, whether you believe in neorealism, neoliberal institutionalism, constructivism, or some combination of each of these depends on what you think the world looks like, i.e. what the underlying structure of incentives looks like, and that can be conveniently represented through game theory. To learn more, you can check out James Morrow's Game Theory for Political Scientists, or look into resources available online like the following.

`http://oyc.yale.edu/economics/econ-159`

[1] You can read more about this in Robert Axelrod's book The Evolution of Cooperation, which is fascinating and easy to read. Also, you can check out the Wikipedia article for "Evolution of Cooperation".