theory's logic problems in this area may be corrected by some adjustment in the initial assumptions and that a more sophisticated specification of the theory might resolve this particular difficulty.[e]

One such modification divides power into three constituent parts: relative, structural, and domestic.[19] In this way there is the chance to bring greater "realism" to structural theories like neorealism. Relative power is akin to what neorealists have in mind when they speak about power; that is, the potential military advantage each state has relative to each other state. By "structural power" Volgy and Bailin mean possession of the ability to shape the rules or architecture of the international system. This form of power is more like that discussed in theories of the power transition or hegemonic war.[20] In these theories, states try to control the organization of international intercourse rather than seek to maximize their security. I discuss these "liberal," or hierarchical theories, a bit later. Finally, by "domestic power" Volgy and Bailin have in mind a reflection of the internal capacity of the state to mobilize resources for its own purposes in contention with the demands and pressures of other internal interests.[21] This viewpoint is more akin to the perspectives taken up in the next chapter. Volgy and Bailin have attempted to integrate the main competing views of international politics while trying simultaneously to reconcile logical or empirical limitations in each. Theirs is a bold effort. Whether it is successful it is too early to say because empirical research on their theoretical approach is just beginning to appear.

LIBERAL THEORIES

Liberal theories emerged as a counterweight to the neorealist perspective. Unlike realist approaches, these theories acknowledge the frequent occurrence of international cooperation. Indeed, a desire to explain such cooperation is their first point of departure from neorealism. Furthermore, for liberal theories, structural **hierarchy**—which implies the presence of an actor that can authoritatively enforce agreements between states—rather than anarchy is the central organizing principle of international politics. The presence of a hegemonic state—that is, an overwhelmingly dominant power—helps enforce norms of conduct and maintain regimes. Norms are generally observed patterns of conduct. For example, most nations most of the time respect the territorial boundaries of their neighbors. They do so because this is an accepted norm of conduct. Although the United Nations exists, in part, to enforce this norm, it can do so only with the consent of its members. Thus, territorial integrity cannot be enforced easily as a matter of law but is generally enforced as a matter of shared values, or norms. Regimes are sets of international laws, rules, and organizations designed to promote coordination among nations

[e] Of course, once new assumptions are introduced to alleviate the problem we have identified, we must see what impact those new assumptions will have on other aspects of the theory. Introducing new assumptions is unlikely to leave other claims of the theory unaltered.

with shared interests.[22] Norms and regimes combine to provide the behavioral basis by which the international system's hierarchical structure promotes cooperation and supports the assumed natural inclination of nations to maximize their wealth.

LIBERALISM. The theory of interdependence, or liberalism, is the most prominent systemic, structural theory concerned more with the international political economy than with problems related to security.[23] Liberalism and neorealism quite naturally focus on different variables. For the structural theory of liberalism, power distributions are not as important as distributions of shared interests produced, for instance, by trade regimes or cultural norms. Trade regimes are agreements and relevant enforcing institutions or organizations designed to regulate and enforce specific trade policies. Their function is to promote cooperation among participants and, in fact, they are often successful in doing so.

For instance, the United States recently attempted to levy tariffs on softwood lumber products imported from Canada and on steel coming from Latin America, Europe, and Japan. These tariffs were brought for adjudication to the World Trade Organization by targeted member states. In early 2004, the WTO ruled in favor of the U.S. claim that Canadian lumber was being subsidized by the Canadian government and sold in the United States below market price, thereby unfairly harming the U.S. lumber industry. Although issues remained regarding how large a penalty the United States could extract from Canada because of its violation of WTO trading rules, still the principle was clear that the United States was entitled to redress.

It was, of course, easy for the United States to comply with this ruling. But in November 2003 the WTO ruled against U.S. steel tariffs. Although President Bush saw these tariffs as important protection for U.S. steel workers (and perhaps for his reelection efforts), he nevertheless backed down in December 2003, rescinding those tariffs found to be illegal by the WTO.

The United States is the world's largest economy and greatest trading power. However, even as powerful a state as the United States altered its trade policy in a cooperative response to pressures arising from the WTO trade regime. The unfolding of these cases and the responses by the sovereign powers involved can be pointed to by students of interdependence theory as evidence in favor of their perspective and in contradiction to neorealism. For instance, the legal apparatus established by the WTO appears to have influenced behavior even when the resulting behavior seems contrary to the national interest, exactly as predicted by liberal theory and contrary to the predictions of neorealism.

Cultural norms, or shared values, may also promote cooperation by making clear what sorts of behavior are unacceptable and open to punishment. Of course, the feasibility of punishment for violating norms or regime expectations depends to a large degree on the assumption that the international system is hierarchical rather than anarchic. Theories that share the liberal perspective are more likely to treat international law as a serious con-

straint on national action, even when the law is contrary to a nation's self-interest (as in the case of U.S. steel tariffs), than are theories, such as neorealism, that subscribe to anarchy.

Adherents of liberalism believe that pursuit of cooperative mechanisms to generate wealth is a principal objective of nations in addition to, or even instead of, national security. According to liberal theorists, power and security vary from issue to issue; they are not unidimensional features of the nation and the system. Thus, liberal theory considers power to be less fungible than does neorealism. Because a nation's power is assumed by liberal theorists to vary from one issue area to another, nations cannot easily capitalize on their influence over one set of problems to exert influence on a different set of problems.

Japan is a case in point. Japanese views on trade must be taken very seriously by the world community. Yet Japan cannot, or at least thus far has not, translated its great influence over trade decisions into great influence over military decisions. For liberal theory, this difficulty in transferring influence from one domain to another—this lack of fungibility—is a central aspect of international affairs. For neorealists, the opposite is true. Power in one domain is power in all domains because the resources that can be used to influence decisions in one area can serve as the basis for tacit or explicit threats in other areas. For neorealists, Japanese economic might translates into political and military influence because Japan can threaten to withhold access to its markets and products if other nations pursue noneconomic policies the Japanese do not like.

The differences in emphasis on fungibility and hierarchy lead neorealists and liberals to focus on quite different aspects of international politics. For example, if power is fungible, as suggested by realists, then it makes sense to think of trade policy as serving the state's broader concerns about security and for trade to be constrained if it leads to absolute gains but relative losses for one trading partner or another.[24] If, however, power is issue specific, as suggested by liberal theory, then it makes more sense to think of trade policy as driven by economic concerns rather than security issues.[25] After all, if the benefits from trade cannot readily be converted into military might, then trade policy really cannot be a significant instrument of national security policy.[26]

Structural liberals focus on international regimes as possible explanations of cooperation among states.[27] Cooperation is not viewed as a general systemic characteristic. Rather, cooperation is viewed as a characteristic of international politics that is compartmentalized according to particular issues or dimensions of international intercourse. Thus, nations might cooperate and fight simultaneously. For example, in 1990 Iraq and Kuwait cooperated as OPEC members to promote higher crude oil prices and fought with each other over border disputes. Consequently, when liberal theorists talk about regimes they mean the rules, norms, and institutions that help coordinate international behavior in specific domains.

THE PROBLEM OF COLLECTIVE ACTION. According to the liberal perspective, the thread that binds nations into a system is the need to overcome problems of **collective action**—

that is, situations in which individual incentives lead to inefficient collective outcomes. This is also known as market failure. These problems arise under two types of circumstances. One type, sometimes known as the tragedy of the commons, involves situations in which a group of people has access to a common pool of resources that may be depleted by any one member or combination of members of the group.[28] This type of resource is divisible but not excludable. That is, all can gain access to the good (nonexcludable), but having gained access, anyone can use up the good (that is, it is divisible and can be depleted).

The second type of collective action problem arises when an international organization or regime provides **public**, or **collective, goods** (the terms are interchangeable), which are indivisible and nonexcludable.[29] A good is indivisible when one person's consumption of that good does not affect the amount that another person or group can consume. Nonexcludability means that anyone belonging to a relevant group can consume the collective good. Fire protection is an example of such a good. If you and I live in different apartments in the same building and you pay taxes toward fire protection and I do not, I will still derive the same benefits from the fire department that you derive. If an apartment in the building is on fire, I cannot be excluded from having my apartment protected by the fire department even though I have not paid the taxes. And the fact that you and other residents have paid the taxes does not diminish the amount of protection I receive. The good is nonexcludable and indivisible. Free trade and defense are two important examples of public goods in international relations.

In contrast to public goods, private goods are not subject to problems of collective action. With private goods, the person or group who produces or receives the good gets to consume it and can prevent others from doing so. Personal income is an example of a private good. Private goods are both divisible and excludable.

Provide additional examples of public goods in international relations. Give examples of ways in which the United Nations provides public goods to its members. Give examples of private goods that the United Nations provides to members. Why can some members of a public goods–providing group get away with paying less than what seems to be their fair share of the cost of providing the good? Give some examples of common-pool resources. How has the environmental movement influenced how nations deal with common-pool resources to prevent the tragedy of the commons? Research the law of the sea on the Internet. How does it reduce the threat of the tragedy of the commons?

The significance of the tragedy of the commons is well illustrated by the efforts of the environmental movement to create new international regimes and norms of conduct designed to prevent depletion of common-pool resources. Consider, for example, the commercial harvesting of fish and hunting of whales in international waters. Fish and whales swim freely in the world's oceans. Fishing fleets from many countries earn their living harvesting tuna, abalone, or lobster. If any of these species is harvested at a rate that exceeds its natural ability to replace itself, then it will become extinct and no one will

be able to fish for it again. The commercial hunting of whales during the past one hundred years brought some species to the brink of extinction.

Why does overfishing (or overhunting) occur if, as is surely the case, those who fish commercially understand the consequences of harvesting too many of any variety of fish? Individually they are motivated to earn as much as possible, which generally means catching as much as possible. They are worried about personal income (a private good) more than the long-term consequences of overfishing. It is in just such situations that the tragedy of the commons arises. Everyone benefits from protecting common-pool resources, but each individual wants others to bear the costs of restraint.

A primary objective of the environmental movement is to promote legislation, regulation, and norms of conduct designed to avoid the tragedy of the commons. Some of these efforts have proved to be successful over a relatively short period of time in altering norms of conduct, at least in some parts of the world. The United States, for example, prohibits the importation of tuna caught by fishing fleets that do not use dolphin-friendly fishing nets. Environmentalists have succeeded in making the U.S. tuna market responsive to avoiding tuna products that endanger dolphins. Because the United States is a large marketplace, many other countries have adopted regulations to ensure that their fleets use dolphin-friendly nets.

Since dolphin security, not national security, is protected by these regulations, neorealism provides a scant basis for explaining the success of these efforts. Liberal theory, however, offers a perfectly straightforward explanation. An international norm of conduct has been established because removing or reducing common-pool resource problems enhances national wealth. It also explains why some countries ignore these norms. For them, the benefits of exploiting common-pool resources exceed those of adhering to international norms of conduct. If all nations conformed to established norms, then there would be no tragedy of the commons and no need for environmental watchdog groups.

International organizations that provide public goods often face the problem of collective action. Individual members of a relevant organization may be motivated to "cheat" for a variety of reasons. If everyone recognizes that some decision makers will take advantage of common interests, then all decision makers have some incentive to do so. To avoid being exploited by others, a nation may be exploitative itself. Or a member may take advantage of others within the organization—particularly if everyone else is thought to be abiding by some norm, principle, or agreement about behavior that ensures the provision of the public good—in the hope of gaining benefits for itself without bearing the costs of producing those benefits. The nation hopes to "free ride" on the actions of other nations in bearing the burden of promoting cooperation and protecting the regimes that facilitate that cooperation.[30] In essence, it wants to derive the benefits from public goods without contributing to the cost of producing those goods. This free riding is a likely strategy as long as the **free riders** believe that the marginal decline in the

quantity of public goods that are produced without their help is smaller than the marginal cost they would incur to help produce more of the public good.

Support for NATO is an example of the free rider problem. The United States has historically paid more than its fair or proportional share of the costs of maintaining Europe's defense through its support of NATO. Other member states, believing that their defense is not as costly as the United States believes, simply accept the high level of defense that those U.S. expenditures provide without contributing more themselves. Of course, they pay something toward the costs of NATO, but then they also receive private benefits beyond the collective good of defense. For example, NATO employs some of their citizens.

UN peacekeeping operations are another instance in which free riders abound. Although not all members contribute equally (or proportionally) to these endeavors, all nations gain benefits from the peace the action is charged with maintaining. Free rides (or at least pretty cheap rides) are common features of the international organization landscape. The free riders get the benefits of the public good without paying the cost. But if some free ride, then the amount of the public good that is provided is less than what it would have been if all riders bore their fair share of the burden.

In an interdependent world it is necessary for nations to collectively set up mechanisms (that is, regimes) for identifying cheating (such as free riding) and punishing it when it is observed. This is a complicated problem because sometimes cheating is hard to detect and sometimes evidence mounts that cheating has taken place when in fact it has not. The available information is sometimes misleading. The problem is further complicated because even if cheating is detected and there is agreement that the culprit should be punished, nations still have to coordinate with each other to establish what the punishment should be and how it should be administered. At this juncture, the risk of problems of collective action arises again as some nations may try to free ride on the benefits of punishing a wayward state. The case of UN peacekeeping operations is an example. Although free riders benefit from the punishment's imposition, they do not share in the possible political or economic costs of the punishment. In fact, payments to the United Nations for peacekeeping efforts are almost always in arrears as members seek the benefits while trying to avoid the costs. In recent years, the United States, particularly, has been notable for its failure to pay its dues and honor other obligations to the United Nations.

LIBERAL THEORIES AND THE PROMOTION OF COOPERATION

In building up a system of cooperation, it is certainly undesirable to punish a nation mistakenly; at the same time, true cheaters must not go unpunished. The mechanisms or political institutions that are developed to monitor adherence to international norms must not be so overbearing or cumbersome that they drive nations out. Figuring out how the international system can reward cooperation and how it can punish cheaters

Leading military and political officials in Pakistan stand with their heads bowed as a Muslim cleric recites prayers for twenty-three Pakistani soldiers killed in Somalia on June 5, 1993, while serving there as part of the United Nations peacekeeping force. The long line of coffins emphasizes the fact that the collective benefits of peace entail high costs, reminding us why so many states prefer to gain a free ride at the expense of others.

through well-structured rules and regimes is central to understanding how liberal theory approaches international affairs.

Liberal theory focuses on two main solutions to the problem of promoting cooperation: hegemony and repeated interaction. Each solution can play a prominent role in promoting cooperation, but each also suffers from important deficiencies.

AMERICAN HEGEMONY AND BRETTON WOODS. Under hegemony, a **hegemonic**, or **dominant, state** is willing to bear the extra burden of providing public goods, such as enforcing a free trade regime, in order that all may benefit. It is in exactly this sense that liberal theories assume that international politics is hierarchical rather than anarchic. The hegemon is a central authority that is able and willing to enforce agreements and punish cheaters.

At the end of World War II, the United States assumed responsibility for providing public goods to the international community—that is, it became a hegemon. It did so by signing the **Bretton Woods Agreement.** Under the terms of this agreement, the United States took on significant responsibility for helping to stabilize world currencies and control global inflation. By guaranteeing that the dollar could be converted to gold on

demand by central banks in other countries, the United States created what was known as a dollar–gold equivalence standard. It provided a means to control inflation and stabilize the world money supply by making the U.S. dollar the world's reserve currency. Thus, currencies acquired fixed exchange rates pegged to the value of the dollar. The cost of one ounce of gold was set at $35, so that anyone could trade an ounce of gold to the U.S. government for $35. Through this exchange rate mechanism the United States guaranteed the stability of currencies by absorbing the costs of inflation itself. At the same time, the United States joined and strengthened the International Monetary Fund and the International Bank for Reconstruction and Development, now known as the World Bank. These two institutions were designed at Bretton Woods, the former to stabilize currencies and economies and the latter to foster economic recovery and development. Each has evolved since then into a quite different organization with changed functions.

By August 1971 the global economic situation had changed dramatically from the days of U.S. dominance in 1945. With deficits growing in the United States and with pressure from the British and French to convert dollars they held to gold, President Richard Nixon reneged on the agreement reached at Bretton Woods.[31] This put an end to the Bretton Woods fixed exchange rate system and moved much of the global economy to a system of floating exchange rates. Whereas under Bretton Woods the fixed exchange rate mechanism dampened global inflation by shifting the burden to the United States, under the floating exchange rate system currencies respond to market forces. One consequence of this shift was a rapid devaluation of the dollar against gold and a sustained outbreak of global inflation. Before President Nixon put an end to the Bretton Woods arrangement, for example, gold sold for $35 per ounce. Afterward, it soared to as high as $400 an ounce. Indeed, so dramatic were these changes that the discarding of the Bretton Woods Agreement and its aftermath sparked debate over whether an end to U.S. hegemony had been reached.[32] Today, however, it seems clear that U.S. hegemony, if anything, has increased.

A significant problem with hegemony as a solution to collective action problems is that, as liberal theorists acknowledge, the international system only rarely sees the emergence of a real hegemon. Furthermore, it can be quite costly for a hegemon to assume the burden of providing public goods, as Nixon's 1971 decision to renege to avoid inflation so dramatically demonstrates. Consequently, a hegemon cannot be counted on to provide public goods, especially when doing so is contrary to its interests. In fact, it is at least as easy to point to historic examples of dominant states using their position to extract tribute from dependent states—just think of the colonial era or of the Roman Empire—as it is to find examples of them providing public goods.

Give some examples of a hegemon providing public goods. What are some examples from history of hegemonic states extracting tribute or wealth from weaker states without in turn providing a public good to resolve a collective action problem?

The unpredictability of hegemons is one reason that liberal theorists began to investigate regimes and norms as alternative mechanisms that nations use to resolve collective action problems. Little evidence has emerged, however, to demonstrate that behavior is actually altered in response to regimes or norms. Having said this, we will see how international law, international organizations, and domestic political institutions might induce states to behave differently from the way they would if such laws and organizations did not exist. We will see how, out of self-interest, leaders form and join organizations and agree on rules designed to tie their own hands by limiting their future choices. The earlier discussion of self-regulation of tuna fishing through changing norms already pointed to one way that leaders accept rules that restrict freedom of action for the benefit of long-term interests.

COOPERATION THROUGH REPEATED INTERACTION. The second solution to fostering cooperation depends on the idea that self-interest can promote cooperation in the long run, even when short-term interests favor conflict, or at least the absence of cooperation. Liberal theory relies here on a concept called the **shadow of the future**. This concept states that under certain circumstances decision makers who benefit in the short run from noncooperation can be persuaded to engage in cooperative relationships if they are shown that to do so would garner them a long-term stream of benefits.[33]

The logic for promoting cooperation when short-term interests encourage noncooperative behavior is best depicted by a game called the **prisoners' dilemma**. The story behind the prisoners' dilemma—which you can see played out almost any night of the week on just about any television police show—is that two confederates in crime have been arrested. Each is held in a separate cell, with no communication between them. The police do not have enough evidence to convict both of them of the serious crime they allegedly committed. But they do have enough evidence to convict them of a lesser offense. If the prisoners cooperate with each other and both remain silent, they will be charged and convicted of the lesser crime. If they both confess, they will each receive a stiff sentence. However, if one confesses and the other does not, then the former will get off with only a light sentence (as part of a plea bargain) whereas the latter will be put away for a very long time.

Let's call the payoff that each prisoner receives when neither confesses (that is, when they cooperate with each other) the reward (R) and the payoff each receives if they both confess the punishment (P). If one prisoner cooperates by remaining silent while the other defects by confessing, then we will say that the cooperator gets the sucker's payoff (S) and the defector gets a payoff we'll call the temptation (T).

In the game of the prisoners' dilemma, T is worth more than R, which is worth more than P, which is worth more than S ($T > R > P > S$). For repeated versions of the game (that is, when people play it over and over again), we will assume that R, the payoff that the two criminals get if neither confesses, is more than twice as large as the combined value of T and S ($R > [T + S]/2$), implying that it is better for the players to cooperate

than it is for them to alternate between confessing and cooperating over time.

Table 4-1 displays the possible outcomes of the prisoners' dilemma. Notice it does not specify the order of play. This is because under the rules of the game, the players each must make their choices without knowing what the other player's choice will be. (Remember, they are being held in separate cells with no communication possible.)

TABLE 4-1
The Prisoners' Dilemma

	Player B's Choice	
Player A's Choice	Cooperate	Defect
Cooperate	R, R	S, T
Defect	T, S	P, P

The game can be solved by finding the **Nash equilibrium.** (Recall that a Nash equilibrium is the set of strategies from which no player has a unilateral incentive to switch.) Player A (or Player B) can start by asking himself or herself what the best move to make is if B chooses to cooperate and what the best move is if B chooses to defect. By examining the payoff implications of B's potential choices, A can determine which move will be most advantageous (although A cannot know what B will ultimately choose to do). Of course, A can also calculate from B's viewpoint, seeing what would be best for B if A cooperates or defects. In this way, both players can formulate their complete plan of action—their strategy—for the game.

The prisoners' dilemma is an interesting way to look at problems of cooperation and conflict because it has a surprising implication. Notice that whatever choice A assumes B will make, A is better off defecting than cooperating. If B cooperates, A will earn *T* by defecting and only *R* by cooperating. Because *T* is more valuable than *R*, it is in A's self-interest to defect. If A assumes that B will defect, then A earns *P* by defecting, which is not very good but still better than choosing to cooperate and thereby only earning *S* (the worst result). Thus, by defecting A can guarantee herself or himself a stiff prison sentence or a chance to get off with only a light sentence but avoid altogether the possibility of receiving a very long prison sentence.

The same logic holds for B. Whatever A decides to do, B is better off defecting. Defection is each player's dominant strategy. In consequence, they each will end up with the second-worst outcome and be handed a stiff prison term. Had they been able to coordinate their choices and cooperate with each other, they could have guaranteed themselves a light sentence, the second-best outcome. Thus, by choosing rationally they each suffered an outcome that was worse than what they would have gotten if they had cooperated. This type of outcome is said to be **pareto inferior.** In contrast, a **pareto optimal outcome** is one in which no player is made worse off and at least one is made better off. Joint cooperation is *pareto optimal,* but the players do not seem to have a rational path to get there because no matter what the other player is expected to do, each finds that defecting dominates cooperating because it earns a bigger reward. This is the dilemma. If international politics frequently involves situations like this, then it seems that conflict rather than cooperation would prevail, as suggested by neorealism's focus on anarchy.

Many situations in international relations mimic the conditions of the prisoners' dilemma. Consider the example of telecommunications in the United States and Mexico. The Mexican government wants to sell its telephone services to Spanish speakers in the United States while still protecting its fledgling telephone industry against U.S. competition. When Mexico privatized its telephone company (Telefonos de Mexico), it guaranteed the company a continuing monopoly for about a decade so that it could get on its feet, forge strategic alliances (which it did with Sprint), upgrade its equipment, and thereby compete in the marketplace. Although U.S. telephone service providers such as MCI, Sprint, and AT&T would prefer to avoid negotiations with Telefonos de Mexico and enjoy open access to the Mexican telephone market, they also want to prevent the Mexican company from enjoying equal access to the large Spanish-speaking telephone marketplace in the United States. The Mexican government, being sensitive to its domestic political situation, is protecting its industry even as it seeks to gain free access to the U.S. market for its phone company. The United States, for its part, has also imposed restrictions on behalf of its home industry in an effort to reduce competition from Telefonos de Mexico for the U.S. Latino market. In effect, both "players" (Mexico and the United States) have sought *T*, leaving their opponents with *S*.

On February 7, 2001, executives from Mexico's America Movil and Telefonos de Mexico joined with executives from the New York Stock Exchange to celebrate America Movil's listing on the New York exchange, symbolizing the furtherance of economic interdependence between the United States and Mexico.

Had each government opened its telephone market fully at the outset, each country's industry would have concentrated on the market niches in which it could be most competitive and productive. U.S. and Mexican consumers would have enjoyed the greatest benefits. By working cooperatively and promoting free trade in telecommunications, then, each would have achieved the best outcome for both, *R*. Instead, because *P* (both governments impose restrictions on access by the other country's telephone services) is better than *S*, and *T* is better than *R*, each has followed a protectionist regulatory policy that prevents achieving the best outcome for both governments through cooperation. Resistance to free trade globally arises from trade involving the prisoners' dilemma, in which each state wants to protect its own industry but enjoy unfettered access to the markets in other countries.

International players may find themselves involved in this type of troubling situation over and over across an indefinite period of time. For example, during the cold war years the United States and the Soviet Union faced off repeatedly in situations where mutual cooperation would have benefited both but mutual distrust prevented (potentially costly) attempts at cooperation. Distrust, in fact, is at the heart of the prisoners' dilemma *and* at the heart of arms races. Because the prisoners' dilemma is a noncooperative game, promises made by either player or both players to cooperate with the other mean nothing. Whatever agreement might have been reached previously, each should recognize that the other player could exploit the situation by defecting. So neither can count on any promise given by the other. This is a perennial problem when rival states unilaterally agree to reduce arms. The promise is not binding, nor is it credible, and if one state disarms and the other does not, the one that cheats gains a significant advantage. This is also a problem in trade relations where promises to open markets are made but no means of enforcing those promises are adopted.

How can one escape the prisoners' dilemma? Suppose that the sucker's payoff is bad, but not fatal. That is, suppose it is something from which one can recover over time. If the game is played an indefinite number of times, then it makes sense to experiment by starting out by cooperating. If the other player also cooperates, both are better off. If the other player does not cooperate, he or she can be punished if the first player then chooses not to cooperate again. Over an indefinite period of repetition, the one-time loss from that initial sucker's payoff becomes trivial against the possible benefit if the other player subsequently cooperates, provided enough value is attached to future payoffs. If this is the case, then each player can credibly declare that his or her strategy will be to make the move the other player made in the previous round of interaction. If a player defects, then both players will get caught up in a cycle of repeated defection; if a player cooperates, however, a cycle of cooperation can continue indefinitely.

We know that if the shadow of the future is large enough to allow a decision maker to recover from a temporary setback, then possible equilibria of the prisoners' dilemma include mutual cooperation.[34] The key is that each player must believe that there is suffi-

cient time to recover from a setback and that the risk of setback is amply rewarded by the prospects of a stream of high payoffs later resulting from cooperation. Defecting now and exploiting the cooperation of the other player provides a short-term benefit, but one that is more than offset by the indefinite stream of punishment that follows when the other player stops cooperating too.

How can players credibly promise to cooperate with one another when they are involved in an indefinitely repeating prisoners' dilemma? It turns out that the solution depends on being able to communicate to the other player how you plan to play the game and establish a credible scheme for punishing cheaters. The North American Free Trade Agreement (NAFTA) between the United States, Canada, and Mexico is, in essence, a declaration of what each country's strategy is for dealing with trade relations in the future. Each promises to keep its market open to the others largely unfettered by tariffs and nontariff barriers. Although there are areas where nontariff barriers exist within NAFTA (for example, U.S. environmental requirements imposed on Mexico), these are part of the agreement and so do not represent cheating. NAFTA has rules and procedures for mediating disputes over alleged cheating. But even without an international regime like NAFTA, it is possible for mutual self-interest to be effective in designing a strategy that leads to cooperation between states engaged in an indefinitely repeated prisoners' dilemma.

A strategy called **tit-for-tat**, or "do-unto-others-what-they-just-did-to-you," is an effective way to play the prisoners' dilemma game when it is repeated indefinitely (or infinitely) and when the shadow of the future is sufficiently large. Tit-for-tat simply involves doing on each move what the other player did to you on the previous move. If one player defects in any round of play, then the other player will defect in the next round. In this way the second player punishes the first for cheating. If one actor cooperates in any round, then the other will cooperate in the next round. This is the way each can reward the other for cooperating rather than seizing the chance to exploit cooperation for a short-term gain. Such a cooperative move by either player would not be rational if the game were played a known number of times, but it is rational when the game is played indefinitely with a large shadow of the future so that there is a big cumulative impact on each decision maker's welfare from cooperating. Tit-for-tat is a "nice" strategy.[35] It is quick to forgive and quick to punish; it is also easy for each decision maker to observe the emerging pattern of play.

Tit-for-tat cannot succeed in making cooperation an equilibrium strategy if the repetitions of the prisoners' dilemma are for a known number of times. In fact, in such a situation, the dilemma cannot be escaped. The reason is simple. Suppose you and I were to play this game five times. We might each promise to cooperate at the outset. We might even play a nastier strategy than tit-for-tat that increases the cost of punishment. We might follow a punishment strategy called a **grim trigger**. Under this punishment strategy, I declare that if you defect even once—even by accident—I will never cooperate

again. It is easy to see that tit-for-tat becomes indistinguishable from the grim trigger once someone has defected. Now, it is straightforward for me to calculate that I cannot punish you if you defect the fifth time we play the game because there will not be a sixth repetition. Of course, you realize that the same holds for me. So, we each have an incentive to defect in the fifth round because at this point the game is not going to be repeated and there can be no punishment for defecting. That means that the fourth round of play really seems like the last part of the repeated game. However, I already know that you have a dominant strategy in the fifth round and that strategy is to defect. As such, the fourth round really is now like the last repetition because I will have no subsequent opportunity to punish you for defecting. Therefore, because each of us will defect in the fourth round, round three will become like the last repetition, and so on down to round one. When the number of repetitions are known, the chance to cooperate unravels, pushing us to defect even in round one because there will be no opportunity to recover from the sucker's payoff in the future by avoiding the punishment payoff and obtaining the reward payoff.

How large must the shadow of the future be to induce players to play tit-for-tat and cooperate? To see the answer let us be more precise about the idea of a shadow of the future. The idea is that people attach more value to something that they receive today than they do to the same thing received tomorrow or the day after or the day after that. That is, they discount the value of something to be received in the future as compared with something they get now. Let us define the shadow of the future as δ such that $0 < \delta < 1$. The larger δ is, the larger is the shadow of the future. Suppose $R = 3$ and $T = 4$, $P = 2$, and $S = 1$. If players cooperate, then they each receive 3 the first time they interact and place a value now of 3δ on cooperating a second time and $3\delta^2$ for the third cooperative interaction and $3\delta^3$ for the next cooperative interaction and so on. If they cooperate repeatedly over an infinite time horizon, the sum of their expected payoff equals $3/(1 - \delta)$.

Now suppose one player defects and the other cooperates. The defector gains the big payoff of T for that round but then faces a payoff of P for all subsequent rounds because the other player switches to defection as a punishment. Then the original defector's payoff is $4 + 2\delta + 2\delta^2 + \ldots$, which can be summarized as $4 + 2\delta/(1 - \delta^2)$. Suppose $\delta = 0.90$ for each player, then if both players always cooperate, each receives a utility of 3 for each round across an infinite horizon of rounds. The current value a player attaches to 3 each round over that horizon, discounted by $\delta = 0.90$, is equivalent to a payoff of 30—that is, $3/(1 - 0.90)$. If one player defects in the first round and then faces the punishment payoff for the rest of the game, the current discounted value of the payoff is $4 + 2\delta/(1 - \delta^2)$ in this case; that is, $4 + (2 \times 0.90)/(1 - 0.81)$, or 13.47. In fact, gaining the temptation payoff T and then facing punishment yields a higher payoff than cooperating for only two rounds given a discount factor or shadow of the future as high as 0.90 and given the payoffs as currently valued. By the third round of interaction, the cooperators have earned 8.13 and the cheater has earned only 7.42. What about the victim of cheat-

ing? In the first round, this player gets the sucker's payoff of 1 and then, having chosen the grim trigger punishment strategy, receives $2\delta/(1-\delta^2)$ for the remaining period of play. For the assumed payoff values, never cooperating if someone once cheats you leads to a cumulative payoff equivalent to 10.47 over an infinite horizon. That is, $1 + [(2 \times .09)/0.19] = 10.47$. Clearly not only is the cheater better off if the players can get back on the path to cooperation, but so is the one doing the punishing. This makes the threat of permanent punishment incredible because the two players have an incentive to renegotiate after a period of punishment so that they can switch to cooperation and improve their lot. Still, there is no guarantee that they will cooperate forever.

It is important to recognize that with a large enough shadow of the future, and with indefinite repetition, cooperation *can* be an equilibrium strategy, and therefore the prisoners' dilemma can be escaped. But we must also realize that cooperation is not the only equilibrium strategy, even with indefinite or infinite repetition. Defection and just about every mix of moves in between always defecting and always cooperating are other possible equilibrium strategies. In fact, a well-known result in game theory, called a Folk Theorem, is that almost any combination of moves can be an equilibrium if a game is repeated an infinite or indefinite number of times. It is also important to note that tit-for-tat is an effective, but not foolproof, way to encourage cooperation in the indefinitely repeated prisoners' dilemma. As the examples above show, there can be incentives to cheat from time to time provided a switch back to temporary cooperation can be negotiated quickly enough. What is more, valuing the future a lot does not always guarantee an increased incentive to cooperate. That depends on the structure of the situation.

In situations in which players can punish short-term exploitation in the long term, as in the prisoners' dilemma, a large shadow of the future encourages cooperation. In those cases, benefits are netted immediately through exploitation; in consequence, future costs are high. The desire to avoid those high costs encourages cooperation. The trade-off between current and future costs and benefits in a "guns versus butter" setting looks quite different, however. In some situations states that spend money on arms ("guns") now rather than on current consumption ("butter") acquire long-term rewards for bearing short-term costs (i.e., defection now yields small rewards now but large rewards later). The more a state values future consumption, the more attractive it is to that state to spend on the military now so that the state is in a stronger position to attack a rival and secure additional consumption opportunities by extracting resources from the vanquished state in the future. In this case, a large shadow of the future makes cooperation *less* likely because costs are borne now (some current consumption is forgone to build up military capabilities for the future), but there are future rewards from defecting. Depending on the temporal sequence of costs and benefits, a large shadow of the future can make cooperation more likely or less likely.[36]

Liberal theory is not as parsimonious as neorealism, but it does provide an improved basis for understanding cooperation. In doing so, it also provides a basis for understanding

conflict precipitated by collective action problems. It is less successful in explaining how cooperation may be achieved in situations in which conflict and competition are brought about by fundamental disagreements rather than by internecine arguments over the division of a commonly shared pie.[37] Nor is it effective in handling distributive problems, especially those not combined with commitment or coordination problems. Regimes and norms are useful ways of thinking about coordination or commitments, but they are not well suited to handling genuine conflicts of interest such as those that arise with distribution problems. In situations in which one side's gains come directly at the expense of the other side, with no offsetting compensation for the loser, liberal theory has little to offer. Wars are sometimes thought of as zero-sum games, in which the winner wins exactly what the loser loses. Two-player zero-sum games do not have cooperative solutions precisely because the two parties have opposing interests. However, even zero-sum situations can offer incentives for some participants to cooperate if there are three or more players.

CONFLICT AND UNCERTAINTY. Liberal theorists view conflict as a product of uncertainty or misinformation about the intentions of other states. If violations of norms of behavior could always be detected and punished sufficiently to make cheating unacceptably costly, then collective action problems would be resolved. Everyone would have a strong incentive to cooperate. Cheating and free riding on the efforts of others would be eliminated.[38] If the coordinating mechanisms of regimes, norms, and the like are working effectively, then they are disseminating information to the states that make up the international system. Information is presumed to help states avoid conflict because they know that others will know if they misbehave.[39] Keohane, for example, maintains that

> international systems containing institutions that generate a great deal of high quality information and make it available on a reasonably even basis to the major actors are likely to experience more cooperation than systems that do not contain such institutions, even if fundamental state interests and the distribution of power are the same in each system. (1984, 245)

The view that information improves cooperation is somewhat problematic, however. Even when states have complementary interests—which is always the case when there is a coordination problem between them—they may also have distributional issues that create a conflict of interest. If this is true, then information may not improve cooperation. As we will see in Chapter 17, when we zoom in on arguments about norms that enhance cooperation, it is entirely feasible for decision makers to choose a violent, conflictual course of action because they are well informed and to eschew such behavior when they are suffering from uncertainty or incomplete information about the capabilities or intentions of others. A brief example may help illustrate the point.

Rivals in war often have common interests that can be realized only through mutual agreement, as required in liberal theory. The treatment of prisoners and the regulation of

certain weapons are just two examples.[40] Germany and the Allied powers (Britain, France, Russia, and the United States) had a common interest in ending World War II on a mutually acceptable basis. The problem was how to achieve such an agreement. One way would have been to weaken one side's position so severely that it was prepared to accept an unconditional surrender. In fact, this is what happened. Such a solution is costly, and states generally look for other ways to resolve disputes. Indeed, unconditional surrender is rare. Even Japan was allowed to impose one condition (preservation of its emperor) on its surrender in 1945 despite the devastation of Hiroshima and Nagasaki, which had greatly weakened the country. A more recent example would be Saddam Hussein's avoidance of an unconditional surrender at the end of the Gulf War in 1991, despite the fact that his armed forces were completely routed.[41]

Let's consider how high-quality information might have influenced the eventual resolution of World War II. German chemists had developed a nerve gas to which there was no known antidote well before the war was over. Such a highly lethal weapon can quickly kill or incapacitate large numbers of people. The German government, as we know, was not reluctant to use toxic gases against civilian populations, as long as there was no credible threat of retaliation in kind by the Allies. Millions of innocent people were murdered in German concentration camps, many by lethal doses of cyanide.

Hitler and others in Germany believed, erroneously, that the United States had developed nerve gas. The primary basis for their belief was recognition that many of Germany's best chemists were living in exile in the United States. Hitler apparently believed that because they were the best, they too had developed nerve gas.[42] Had he known the truth—had he possessed high-quality information on this matter—he may very well have ordered the use of nerve gas in combat, knowing that the Allies could not retaliate in kind. It is conceivable that use of nerve gas over cities would have had an effect on the Allies comparable to the effect that use of the atom bomb had on Japan. It is plausible that the use of nerve gas would have prompted a conditional surrender at war's end rather than the unconditional surrender ultimately imposed. A conditional peace would have been potentially disastrous, perhaps leaving the Nazi regime in power in Germany. Secrecy, then, led to a better result than might have been obtained with the even distribution of high-quality information. Better information is not a guarantor of cooperation, and poorer information does not necessarily make conflict more likely.

MARXISM

Marxism is yet another systemic, structural theory, although again it focuses on different characteristics of a system from those emphasized by realism and liberalism. Marxism employs class structure and economic forces to explain why some nations play the role of imperialist or colonial powers while others are relegated to the role of exploited, dependent, or colonized territory. Whereas neorealism views the distribution of power as the defining element of the international system, Marxist theory posits that the distribution