

# Cooperation: A Manual

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*A note to the reader: People cooperate so much of the time that they often take it for granted. And, when people fail to cooperate, people often don't have the tools to understand why. This manual is built upon the premise that we should teach cooperation as a basic skill alongside such other basic skills as reading, writing, and arithmetic. My hope is that anyone who would like to learn more about cooperation and how to make it happen more often in their lives can read it in a single sitting. I plan to revise and repost this manual frequently, so feedback would be very much appreciated. You can email me at leecronk@rutgers.edu. In the interest of brevity, I have not included very many examples of cooperation in the real world. In future versions of this manual, such examples may be included in boxes so as not to interrupt its flow. Also in the interests of keeping this manual brief and easy to read, I have not included formal citations. However, at the end you'll find an annotated list of additional readings. Most of the research mentioned in the manual is cited in one or more of those readings, especially Meeting at Grand Central: Understanding the Social and Evolutionary Roots of Cooperation (Princeton University Press, 2013), which I co-authored with Beth L. Leech. This manual also includes an appendix that provides some more technical details about various cooperative games mentioned in it.*

Consider your typical day. If you are like most people, then from the time you wake up to the time you go to sleep you cooperate with other people in a wide variety of places and in a wide variety of ways – at home, at work, while dining, while shopping, while playing, and so on. Perhaps because people already cooperate so much, cooperation is often taken for granted. But everyone is also well aware that cooperation often fails to occur when we would most like it to: people shirk their responsibilities, people squander shared resources, people are bad drivers, people are unhelpful, and, sometimes, people lie, cheat, and steal. Thus, cooperation cannot and should not be taken for granted. On the contrary, cooperation, just like reading, writing, and arithmetic, should be taught to everyone as a basic life skill. If we all had a better understanding of what makes cooperation more likely and what prevents it from happening, we would be happier people in a more harmonious and successful society. That is a goal worth striving for.

The goal of this manual is to give people a set of concepts that they can use to think more clearly about cooperation and to talk to each other about it. For that reason, throughout this manual important terms and concepts are in **boldface type**.

The first key concept is **cooperation** itself. I use the term in the same way people use it in everyday speech: People working together. As we will see, sometimes people have to pay some sort of cost in order to cooperate, but, as we will also see, people also often find themselves in win-win situations in which everyone benefits from cooperating.

## 1. Our cooperative nature

People cooperate in order to accomplish goals that they would not be able to accomplish alone. People also often cooperate simply for the pleasure that cooperation brings to them. For example, people may play music together, participate in sports together, or engage in volunteer work together simply to experience the feelings of accomplishment and social solidarity that such activities generate. The fact that people enjoy cooperating with one another suggests that our internal motivational system evolved to encourage us to cooperate. This is in keeping with the observation that humans cooperate with each other more often, in a wider variety of ways, and on larger scales than do members of any other species. In short, cooperating is part of our nature.

Because cooperating is part of our nature, we have a variety of specialized psychological mechanisms that help us accomplish it. So deeply rooted are these mechanisms that we are often not aware that they are at work or even exist. For example, most of us have the ability to imagine what someone else is thinking, feeling or knowing, including the possibility that they may think, feel, and know things that are quite different from what we ourselves think, feel, and know. Most of us go from moment to moment creating many such mental models of other people's mental states without giving it any conscious thought. This ability is referred to by scholars by such names as **Theory of Mind**, **mentalizing**, and **perspective-taking**. **Empathy**, the ability to feel what others are feeling, is a closely related ability. Because this ability allows us to coordinate our behaviors with those of other people, it is an enormous boost to cooperation. The helpfulness of this ability becomes obvious when it is somehow stymied. For example, because we get many cues regarding other people's mental states from their facial expressions, we find it more difficult to understand other people, particularly their emotions, when communication with them is limited to writing. Perhaps that's why emojis are so popular when people send text messages to each other.

Our other psychological mechanisms for cooperation build on that foundation. For example, we often use our ability to model the mental states of others to imagine what they are thinking about our own actions. Because most of us would like to have reputations as being generous, kind, and cooperative, this concern about audiences and reputations drives a great deal of cooperative behavior. Conversely, when people are assured that there is no one observing their behavior, they often take it as an opportunity to behave in surprisingly antisocial ways. For example, consider the rudeness, incivility, and abuse that often emerge when people on the internet are assured of anonymity. Fortunately, it does not take much to trigger people's concerns about their reputations. In fact, some research has shown that all it takes to get people to be more cooperative is to expose them briefly to images of eyes. Even an upside-down triangle consisting of two spots above and one spot below seems to be enough to trigger the part of our brain that recognizes faces, leading people to be more generous.

We also have an intuitive understanding that many cooperative endeavors, such as group projects, will not succeed unless the people involved are committed to them. For that reason, if we want a group endeavor to succeed, then we often find ways to express our commitment to it and to assess other people's level of commitment to it. Such commitments might be expressed verbally, but a **signal of commitment** that consists of a behavior, particularly a behavior that someone who lacks a commitment would be unable or unwilling to do, is often more convincing. For example, committing some of one's time or resources to the project without waiting for others to do so might convince others that the project is likely to succeed and so worth investing in themselves. Groups that exist for other reasons and that expect their members to express their commitment to the group also often find it relatively easy to foster cooperation because of the level of trust that already exists among their members. For example, religions often expect their members to express their commitment to the religious community in various costly ways, such as regular prayers, fasting, tithing, wearing particular kinds of clothes, and forgoing particular kinds of food and drink. Research has shown that, perhaps as a result of the level of trust among co-religionists engendered by such displays of commitment, religious groups tend to cooperate more easily more often than do secular groups.

Our ability to form emotional commitments to groups is another aspect of our psychology that fosters cooperation. Research has shown that people are keen to identify with coalitions or teams, even if those coalitions or teams are only temporary and based on arbitrary criteria. This **coalitional psychology** helps us identify who are our allies and who are our competitors and is particularly easy to activate when one cooperative group is competing against another cooperative group.

When efforts to cooperate fail, it is often because someone is trying to get a benefit from the cooperation without contributing to it. This kind of behavior can range from simply shirking one's duties to outright theft. To combat such behaviors, we are constantly assessing others as potential cooperators or cheaters. Such **cooperative partner choice** helps us associate with cooperative people and avoid uncooperative ones. Research shows that our ability to assess other people's cooperativeness, while certainly not perfect, is better than chance. When we suspect someone is getting a benefit without cooperating, our **cheater detection** mechanisms are activated, triggering emotions ranging from indignation to hatred that motivate us to take action against cheaters. One such action that is particularly effective at promoting cooperation is ostracism, i.e., avoiding contact with cheaters and spending time instead with people known to be cooperative. The phrase "know when to walk away" applies not only to gambling but also to cooperation: When it's not working out because people are not cooperating with you, consider finding other people to cooperate with, instead.

Despite the fact that we have all of these abilities that can and do help us cooperate, we cannot rely solely upon them to reach our cooperative goals. One reason for this is that these various mechanisms do not always work correctly. We may try to imagine what someone else is thinking, but we may get it wrong. Studies show that we are particularly bad at accurately understanding the thoughts and motivations of people we perceive as our adversaries, opponents, or enemies. We may try to distinguish cooperators from cheaters, but we may make mistakes and end up trying to work with uncooperative people. Our tendency to identify with the coalitions to

which we belong may inadvertently blind us to opportunities to cooperate profitably with people outside our coalitions.

## 2. Challenges to cooperation

Another reason why we can't rely solely upon our cooperation-enhancing abilities is that cooperation occurs in specific situations that have characteristics that our intuitive abilities are ill-equipped to understand. Successful cooperation requires us to understand a set of concepts that clarify the situations in which cooperation occurs and the kinds of things that often prevent it from happening. The purpose of this section is to give you an understanding of those important concepts. This will provide you with the necessary tools for diagnosing and fixing problems that beset your own efforts to cooperate.

**Conflicts of interest** are one major reason why cooperation sometimes fails. Imagine, for example, that your teacher has given you and four classmates a group assignment. You might all want a good grade, but, because you are all busy, you are also all tempted to slack off and let others do the bulk of the work. This is known as the **collective action dilemma** or **collective action problem**. Because those who do not do their fair share of the work are called free-riders, this is also called the **free rider problem**. Collective action dilemmas often arise when the outcome of the cooperation is something that it is difficult to prevent free-riders from enjoying as much as those who contributed it its creation. That characteristic is known as **difficult excludability**, i.e., it is hard to prevent people from enjoying it even if they did not help create it. For example, if your teacher is planning to give everyone in your group the same grade regardless of how much each individual in your group contributed, then the grade has this characteristic of difficult excludability: if the group gets an A, then even a student who contributed nothing to the project will also receive an A.

A common term used for products of cooperation that have difficult excludability is **collective good**. Collective goods come in two types: **public goods** and **common pool resources**. Like all collective goods, public goods are characterized by difficult excludability, but one person's consumption of the good does not detract from someone else's ability to consume it. This is referred to as **low subtractability** or **low rivalry**. The fact that a lazy student receives an A on a group project does nothing to diminish the A that the hard-working members of the group received. Common pool resources, in contrast, have not only difficult excludability but also **high subtractability**, also known as **high rivalry**: When one person consumes them, it reduces the amount available for other people to consume. For example, if you and all your farming neighbors all irrigate your fields with water from the same source, when you take water to irrigate your field you reduce the amount available for the rest of the community to use. In the worst case scenario, this can lead to a situation known as a **Tragedy of the Commons**: a scramble to consume the resource before it is gone that ultimately leads to the destruction of the resource.

A side note: It is important not to confuse the idea of "a public good" with the idea of "the public good." A public good is one with difficult excludability but low subtractability. *The* public good is a broader, less well-defined concept that you mostly find in political rhetoric and that people may have conflicting ideas about. Even if you are cooperating with others to enhance

what you perceive to be “the public good,” you may do so not by creating *a* public good at all. For example, if you are improving *the* public good by providing people with, say, inexpensive but high quality shoes, you are creating not a public good but a private one, meaning one with high subtractability (if you wear a pair of shoes, no one else can do so at the same time) and easy excludability (if you don’t pay for a pair of shoes, it is fairly easy to prevent you from walking out of the store with them).

Even if there is no conflict of interest, cooperation may fail to occur for another reason: People simply do not have the necessary information to make it happen. This is known as a **coordination problem**. Imagine, for example, how hard it would be to drive your car if no one knew whether to drive on the right side or the left side of the road. You would need to go very slowly and work it out separately with each and every car you encountered. Given how frustrating that would be, you might decide to simply park your car and walk, instead.

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	<i>Subtractability:</i> How much does one person's use of the good prevent someone else from also using it?		
		Low (i.e., non-rivalrous)	High (i.e., rivalrous)
<i>Excludability :</i> How hard is it to prevent people who haven't paid or contributed to its creation or maintenance from using the resource?	Difficult	<b>Public goods</b> Example: National defense	<b>Common-pool resources</b> Example: Communally owned irrigation water
	Easy	<b>Toll or club goods</b> Example: Toll roads	<b>Private goods</b> Example: Shoes

**Table 1. Different kinds of goods**

**3. The games people play**

One way to sort out different situations in which cooperation may or may not occur is by thinking about them as games. By “game” we do not mean board games or video games but rather social situations in which each person’s best option is determined at least in part by what

other people choose to do. Although the games we play in real life often involve many people, it is easiest to think about simple two-person games.

Let's begin with a game in which there is a built-in conflict of interests. Imagine you are sitting in a long, narrow boat with two seats, one fore and one aft, and two sets of oars (Figure 1). The oars in this kind of boat are called sculls, so it is called the **Sculling Game**. How many points you score in this game depends on whether you and the other person in the boat decide to pull on your oars. The best possible outcome for you is if the other person pulls on their oars while you sit and do nothing. In that scenario, you are literally a free-rider, and you arrive at your destination completely rested and able to enjoy it fully. The next best outcome is when you both pull on your oars. That way you arrive at your destination, but you are more tired than you would have been if you had not pulled on your oars, so you cannot enjoy it quite as much. The next best outcome for you is for both of you to simply sit in the boat and do nothing. You don't get to your destination, but you also don't tire yourself out. The worst possible outcome is for you to pull on your oars while the other person does nothing. In that situation, you arrive at your destination, but you are too exhausted to enjoy it at all. Because pulling on the oars carries the risk of ending up with the worst possible outcome, both people will be tempted to not pull on their oars. If they are making their decisions about whether to pull on their oars independently, no cooperation will occur, and the collective good of reaching the destination will not be achieved.



Figure 1: A two-person sculling boat. Source: By I, Dontworry, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=3165020>

The Sculling Game is actually a re-casting of an older game that is well established in the scholarly literature. It is called the **Prisoner's Dilemma Game**. Imagine that you and a friend have committed a crime together and have made a commitment to each other that you will remain silent if the police question you about the crime. Unfortunately for you and your friend, the police have caught you both and are interrogating you separately. If you both remain silent

(equivalent to both pulling on the oars in the Sculling Game), you will receive a moderate prison sentence. If you both talk to the police (equivalent to both of you simply sitting in the boat in the Sculling Game), you both receive a more severe prison sentence. But if one of you talks to the police (equivalent to sitting and doing nothing in the boat) while the other remains silent, the one who talks walks free while the other receives the most severe prison sentence of all (equivalent being the only one who pulls on the oars). Because each prisoner has to make their decision about whether to talk to the police separately, they may both be tempted to talk to the police in order to avoid the worst possible outcome for themselves. Thus, as in the Sculling Game, the most likely outcome is that they will decide not to cooperate with each other, and the collective good of two relatively short prison sentences will not be created. Although the Prisoner's Dilemma is the original version of this game, most people find it easier to understand the Sculling Game because the payoffs are in positive rather than negative numbers.

Another advantage of the Sculling version of the Prisoner's Dilemma Game is that it sets the stage for us to consider another game involving a boat. Let's call it the **Rowing Game**. In this game, the two rowers sit side by side rather than fore and aft, and each one has only one oar to pull (Figure 2). In this situation, the points you earn for pulling or not pulling on your oar are quite different from those in the Sculling Game. If you both pull on your oars, then you both get the highest possible payoff because you reach your destination. If neither of you pulls on your oars, then you get a moderate payoff because, although you don't go anywhere, at least you don't expend any energy. If one of you pulls on the oar while the other does not, the boat simply spins in place. The one who pulls becomes exhausted and gets the lowest possible score while the one who does not pull gets the same moderate score that anyone receives for simply sitting in a boat that does not go anywhere.



Figure 2. A rowboat with two rowers sitting side-by-side, each with one oar, as in the Rowing Game. Source: <https://www.whitehallrow.com/>

Like the Sculling Game, the Rowing Game is a re-casting of another game that is well established in the scholarly literature. It's called the **Stag Hunt Game**. Imagine two hunters who need to cooperate to hunt a large animal, such as a stag, but who can also hunt a small animal, such as a hare, all by themselves. They receive the highest possible payoff if they work together to hunt a stag, which is equivalent to both people pulling on their oars in the Rowing Game. If they both hunt hare, then, like the people who sit in the rowboat and do nothing, they both receive a moderate payoff. But if one person sets out to hunt stag unaided by another hunter, then he will come home empty-handed, which is equivalent to rowing while the other person sits and does nothing in The Rowing Game. The other hunter who decides to hunt hare alone will come home with a hare, which is equivalent to sitting in the boat while the other person rows in the Rowing Game. The Stag Hunt and Rowing Games are examples of **pure coordination games**. That means that there is no conflict of interest between the players, and the only problem they need to solve to cooperate is to coordinate their actions.

Although the Sculling and Rowing Games may be easier to understand, because the Prisoner's Dilemma and Stag Hunt Games are so widely known it is important to also have them in your cooperation vocabulary and conceptual toolkit.

Tweaking the Stag Hunt or Rowing Game yields yet another interesting game called the **Battle of the Sexes**. In this scenario, a married couple shares a desire to spend the evening together, but one of them prefers to spend it at a football game while the other prefers to spend it at the ballet. This creates a cross between a coordination game and a conflict of interest situation. The two people agree that their greatest desire is to coordinate their actions and end up together in the evening, but they have a conflict of interest in terms of where that might happen.

A real world Battle of the Sexes is constantly taking place in Washington, DC, among interest groups and legislators. The battle is over the legislative agenda: There isn't time to do everything at once, so what does each player in the system decide to work on to advance their own priorities? Like the married couple, they rank the various possible outcomes differently, but their rankings do overlap somewhat. As a result, the issues that make it onto the legislative agenda are a compromise between the desires of the various political players.

**The Game of Chicken** is even more conflict-filled than the Battle of the Sexes. Imagine two drivers in cars facing each other from a hundred yards away or so, with an audience present. They then drive at high speed toward each other. If they hit each other, they both get no points (and, if this were being played for real, they would very likely be dead). If one swerves to avoid the collision, he is labeled a "chicken," in the derogatory sense of a coward, and he receives a single point. That's better than being dead, of course, but it's far less than the number of points received by the driver who does not swerve and yet survives. That brave (or crazy) driver receives the highest possible score – say, five. If both drivers swerve, then they both receive a moderate payoff – say, three: because they both swerved, they don't suffer as great a blow to their reputations as does the lone swerver.

When politicians in the United States threaten to shut down the federal government if they don't get their way regarding some policy or legislation, they are playing a Game of Chicken. Each side is hoping that the other side will fear the shutdown more than the new policy

or legislation that it will back down to avoid the shutdown. Negotiations between unions and employers can also sometimes resemble a Game of Chicken, with both sides hoping that the other fears the negative impacts of a strike (no pay, no profits) more than the negative impacts of reducing their negotiating demands.

If the Game of Chicken is too extreme for you, imagine this more benign scenario: It has just snowed, and your car and another car are stuck in a narrow alleyway. The two cars are very close together, so there is very little snow between them. As a result, both cars could be freed if the snow is cleared from either end of the alleyway. This **Snowdrift Game** is, from a game theoretical perspective, the same as the Game of Chicken, with digging being equivalent to swerving and sitting in your car and doing nothing being equivalent to driving straight. The most cooperative outcome would be for both drivers to help dig the cars free. But if one driver needs to get somewhere badly enough, it may be worthwhile for her to go ahead and dig the cars out even if the other driver refuses to help. If she does that, then she will be creating a benefit for the other driver not intentionally but rather as a byproduct of something she is doing for her own benefit. Economists refer to that as a **positive externality**. Other scholars refer to that situation as **byproduct mutualism**.

Being aware of these various kinds of cooperation games and the challenges they present is useful, but what if you and the person you are interacting with don't agree on what kind of game you are playing (i.e., what kind of social situation you are in)? That is a very common situation, and it highlights a broader coordination game in which all these games are played: How can we get everyone involved in a particular situation to agree on what kind of a game they are playing? What if some people think they're playing the Rowing Game, where there are no conflicts of interest, while others think they are playing the Sculling Game, which is all about conflicts of interest?

One common way people fail to coordinate regarding the type of game they are playing is by not agreeing on whether the game is **positive sum** or **zero sum**. A positive sum game or interaction is one in which everyone involved stands to gain from it. They will not all necessarily gain equally, but there is at least the possibility that they will all gain something. All of the games described above are positive sum in this sense. So are voluntary economic transactions: When you buy, say, a sandwich, you benefit by gaining access to the food you want to eat and the sandwich maker benefits by gaining access to money. Zero sum games, in contrast, are those in which there is a winner and a loser. Most games and sports we play for fun are zero sum. In a game of chess or baseball, there can be only one winner. The other party is by definition a loser (although simply participating, even if you lose, can sometimes be a reward in and of itself). If winning is equal to one positive point and losing is equal to one negative point, then the sum of those two values is zero. Theft is an example of a zero sum interaction in everyday life: A successful thief is the winner because he gets your possessions, while you, the victim, are the loser. In the marketplace, competition among sellers of the same product is a zero sum game: If you buy your sandwich from the deli rather than the grocery store, the deli wins and the grocery store loses, even though your transaction with the deli remains positive sum.

A major obstacle to successful cooperation is a failure to realize that you are in a positive sum situation and to instead mistake it for a zero sum situation. One reason for this may be that

some positive sum games can engender resentment because the higher payoff goes to the person who contributes least. Consider, for example, the Snowdrift Game. If you dig your car out while the other person sits in his and listens to the radio, even though you have clearly decided that the payoff you will receive for digging out your car (say, getting to work on time but exhausted from digging) makes it worthwhile for you to dig, it is understandable that you might feel some anger towards the other driver given that he will get a greater payoff (say, getting to work on time but still full of energy because he did not do any shoveling). However, the situation remains positive sum, and it is still worth it for you to do all of the digging, if need be. Nevertheless, when you feel that you are losing to someone else in a game that you perceive, rightly or wrongly, to be not only zero-sum but unfair, you naturally feel resentment, anger, envy and other negative emotions. Those emotions can be major obstacles to cooperation.

#### **4. Using our cooperative nature to solve the challenges of cooperation**

As a first step toward overcoming the challenges to cooperation, let's think about how our cooperative nature might help. Our ability to put ourselves in someone else's shoes is usually automatic, but it is worthwhile being aware of it and being aware that it may take some conscious effort on your part to do it well. Empathizing with someone else may be particularly difficult if they are very different from you, if you don't find them particularly appealing to interact with, or if you consider them your opponent. Fortunately, simply being aware of this kind of challenge will give you an advantage in overcoming it.

Most of us care about our reputations, and that can also be a great aid to cooperation. When people know that others will be aware of what they do, they usually become quite a bit more cooperative than they might have been if their actions were anonymous. This is the reason why so many web sites no longer allow anonymous posts and instead require that people register with the site and use their own names. The take-home lesson is that it is often a good idea to spend time working with people face-to-face so that everyone is aware that others are aware of how cooperative or uncooperative they are being.

People are reluctant to join in a group effort if they are afraid that they will be the only ones who will do so. But, on the other hand, people are much more likely to contribute to a group effort if they know that others will also pitch in. If the goal you are trying to achieve with your group is valuable enough to you to take a risk that your efforts may be wasted, you can set an example that will encourage others to pitch in by being the first to do so. By demonstrating your personal commitment to the project with your own actions, you increase the likelihood that others will decide it is worthwhile for them to contribute, as well.

Studies have shown that people are more cooperative with each other when they feel that they are in the same coalition or on the same team. That's why team-building exercises are so often included in corporate retreats and why schools hold pep rallies. As silly as those kinds of things may seem at first glance, they work because they tap into our coalitional psychology. Many team-building exercises also involve coordinated movements, which have been shown to increase people's cooperativeness, perhaps because it creates a sense that we're on the same team. The take-home lesson is that if you are trying to increase cooperation among a group of people, think about how you can enhance their sense of being a team. If your group is competing

with another group (e.g., one company competing with others for sales or one sports team competing with others on the field), then that will be easy to do. But even if your group is not competing with another, you can accomplish the same thing by emphasizing that your group members all share a commitment to your common goal. It also helps to create markers of team membership through the use of logos, slogans, matching t-shirts, matching coffee mugs, and so on. The words you use can also have an impact on how much people cooperate. For example, researchers have found that simply referring to the other people in an experiment as “partners” rather than as “opponents” can increase people’s ability to empathize with the other people and their generosity towards them.

Perhaps the most important aspect of our cooperative nature for successful cooperation is one that needs to kick in even before you ever try to cooperate: cooperative partner choice. As valuable as it is to have people on your side, not everyone will be either as committed to the project as you need them to be or have the skills you need on your team. Working with someone who is either uncommitted or unskilled may be more frustrating than simply working on your own. Treat your recruitment efforts like a job search: Seek out the most committed and most qualified people, and don’t be afraid to decline offers of help from people who don’t have those characteristics. Or, better yet, find ways that such people can still help. For example, if someone is eager to help but doesn’t have the particular skill you need, find out whether they would be willing to make a donation to the group so that you can hire someone who does. Sometimes the most helpful and cooperative role a person can play is to do whatever they do best to earn money that they can then donate to the causes they care most about. If your eager but unskilled volunteer can’t make a donation, maybe they could run some sort of fund-raiser, instead. It is also important to pay attention to how cooperative your prospective group members are in general, not just when they are cooperating with you. As humorist Dave Barry once wrote, “A person who is nice to you, but rude to the waiter, is not a nice person.” It might be best to avoid a person like that. Although they may contribute something valuable in the short run, in the long run their disagreeableness might undermine your group’s cooperation.

One thing to avoid while choosing your cooperative partners is focusing solely on people who are similar to you in some way. Although doing so might make the experience of cooperating with others more fun for you because you have so much in common with your team members, research has shown that homogeneity among team members can actually hinder rather than help cooperation. On the other hand, when dissimilar people work together, they bring to the task their different backgrounds, perspectives, skills, and knowledge sets. That diversity can lead to greater creativity and ultimately to more cooperation and a better outcome. Of course, diversity can also lead to conflict, but that is not necessarily a bad thing. Research also shows that a moderate amount of conflict, as long as it is about the task at hand and not such distractions as personalities, can stimulate creativity and problem-solving. What exactly is meant by “diversity” is going to depend on the context in which you are trying to cooperate and what your goal is. If you are organizing a community group, then you would be wise to build a team that includes people that capture your community’s ethnic, religious, and socioeconomic diversity. If you are building a team to cooperate in a workplace setting, then you should draw upon the diverse skill sets available among your fellow workers.

## 5. Using our conceptual toolkit to solve the challenges of cooperation

But tapping into our cooperative nature will often not be enough to get cooperation off the ground. You may also need to use the various concepts explained above. For example, now that you know what the collective action dilemma is, consider how it might be overcome. Fortunately, scholars have already researched this question quite thoroughly, and they have some advice to offer.

First, it is clear that small groups usually cooperate better than big ones. It is easier to monitor people's behavior in small groups than in big ones, and in a small group it is more likely that everyone will have the sense that the benefits they will derive from cooperation will compensate them for whatever they have contribute to it. If you have no choice but to work with a large group, consider breaking the group's task down into several smaller tasks, each of which can be tackled by a small subgroup. The value of this approach can be seen in the fact that most large bureaucracies are divided into **hierarchically organized task groups**. Dividing one large task up into several smaller ones also opens the door to **role specialization** and a **division of labor**. That allows individual group members to complement each other's actions by focusing on whatever they do best.

Second, it might be a good idea to give your group members some additional incentives to get involved and stay involved in your cooperative endeavor. The technical name for such additional incentives is "**selective benefits**." Selective benefits come in three main varieties. **Material benefits** are things you receive from a group's organizers when you join. For example, when you join a membership organization, you might start receiving their newsletter or magazine, or you might be able to get discounts that the organization has negotiated on the behalf of its members. An "**expressive benefit**" comes to group members simply through the enjoyment they receive from expressing their beliefs and values by working to accomplish a shared goal with like-minded people. A "**solidary benefit**" is the pleasant, rewarding feeling of oneness with your fellow group members that you feel when you work with them toward your common goals. From the point of view of a group organizer, one nice thing about expressive benefits and solidary benefits is that they don't cost you anything – they come automatically from the group's actions. But it still might be worthwhile cultivating sense of belonging to a team among your members to increase the chances that they will indeed experience those kinds of emotional benefits.

As you know from Section 3, in situations described by the Prisoner's Dilemma Game and the Sculling Game the highest payoff actually goes to the person who contributes least to the cooperative effort. Those would seem to be bad situations in which to hope for cooperation. Fortunately, there is an easy solution: Repeat the game over and over again. When you take a conflictual situation and repeat it over and over again, it changes from a conflict of interest situation to a coordination problem because of the way that the payoffs add up round after round. In a repeated Prisoner's Dilemma Game, for example, if both players defect from their cooperative agreement round after round, they end up with a much lower score in the long run than if they both cooperate round after round. In a Battle of the Sexes Game, where players rank the outcomes in similar but not identical ways, repeating the game over and over gives them an opportunity to learn to take turns, which in the long run will even out their payoffs.

Recall that a coordination problem is defined as a situation in which everyone would benefit from coordinating their actions but they fail to do so because they don't have the necessary information. What they need is **common knowledge** about how the coordination problem might be solved. If, for example, the problem is which side of the road to drive on, then everyone needs to know that it's a convention to drive on either the right or left side, depending on which country you are in. But common knowledge is not enough: If you know the solution to a coordination problem but you have no reason to believe that anyone else knows it, then you have no reason to act on your knowledge. So what you need is not only common knowledge but also **common metaknowledge**, i.e., common knowledge that there is common knowledge. Then you not only know the solution, you also know that you can trust others to know it and act on it, as well.

When solutions to coordination problems are long-lasting, they become **social coordination conventions**. Perhaps because being able to coordinate our efforts with those of other people is such a valuable skill, we seem to be especially sensitive to the influence of social coordination conventions, often allowing our behavior to be shaped by them without much conscious thought. Language is a case in point. Languages include conventions about what words mean, what order words should be put in, and how words should be modified to indicate things like tenses and plurals. Given how valuable language is for social coordination, it is not surprising that when we learn a new language we do not argue about the meanings of words or the proper way to create a plural noun from a singular one. If a native Spanish speaker tells you that the word for table is *mesa* and that the word for tables is *mesas*, you simply accept that and move on rather than arguing that there should be some other way to say those things.

Common knowledge, common metaknowledge, and social coordination conventions can be generated in a variety of ways. One way is simply for a group leader or someone else in a position of authority to announce what the solution to a coordination problem is going to be. For example, the official meanings of measurements such as "meter" and "gram" are set by an international organization called the General Conference on Weights and Measures. Such standards facilitate commerce by removing ambiguity about how much of a particular product is being bought and sold in a given transaction. Private sector organizations, such as the American National Standards Institute, do the same thing for a variety of standards that are essential for coordination among different kinds of engineers. On a smaller scale, group leaders are often responsible for setting agendas for group meetings.

Common knowledge, common metaknowledge, and social coordination conventions can also simply emerge as people go about their business, with no central authority being involved in any way. Although rules about which side of the road to drive on are now laws enforced by governments, they originally emerged simply as people encountered each other on horseback and in horse-drawn vehicles. Or consider language again. Although invented languages such as Esperanto and Klingon do exist, most languages are complex collections of social coordination conventions that develop and change as people use them. On the scale of a small group, a social coordination convention that might emerge is a division of labor among its members, ideally with each member doing what they do best and have the time to do.

But even if a social coordination convention simply emerges, it is often worthwhile to discuss it openly and to consider whether it is the best possible convention. Take language, for example. Although none of us as individuals has the power to change language at will, we do often have public discussions about the ways words are used, and those discussions sometimes lead to real, long-lasting changes. My use of the word “they” instead of the more cumbersome “he or she,” for example, reflects a recent public conversation in American society about gendered language in the context of changing ideas about gender itself. Or consider the division of labor that has spontaneously developed within your small group: Is it the best possible division of labor, or does it reflect conditions that no longer exist? Perhaps when it became established it reflected the fact that one group member had a lot of time to contribute to the group effort while another did not. If that’s no longer the case, then maybe it’s time to have a conversation about adjusting the convention. This relates to a more general principle: Good communication is essential for cooperation to occur. People need to have ways to air their grievances and settle them before they threaten the success of the group’s efforts to cooperate. That is why most groups that are successful in the long run have established procedures for changing their rules and for resolving internal conflicts.

## 6. Cooperate!

There are an infinite number of reasons why you might want to cooperate with others. Perhaps you want to do something charitable, such as run a food pantry. Maybe you want to run a political campaign to get someone elected. Perhaps you want to change a particular public policy. Maybe you want to run a business and make some money. Whatever your goal might be, this manual can help. But remember that for cooperation to occur there has to be common knowledge among the would-be cooperators. So, rather than keep all your new knowledge about cooperation to yourself, ask everyone in your group to read this manual and then talk about it. What are the games you are playing? Does everyone perceive the situation in the same way? Can you foresee any problems? Having an open conversation about these kinds of things in the short run will help your group greatly in the long run.

## 7. Glossary of key terms and concepts

**Battle of the Sexes Game:** A **coordination game** with some conflict of interests. See the appendix for details.

**Byproduct mutualism:** When someone receives a benefit from someone else’s actions even though that was not the purpose of those actions. This is closely related to the concept of **positive externalities**.

**Cheater detection:** The ability to identify people who break social rules about such things as fairness, paying debts, and contributing to the production of public goods.

**Coalitional psychology:** The tendency people have to identify and form social groups very easily and quickly, often based on only minimal cues about group membership and identity.

**Collective action dilemma/problem:** The problem that arises when, although people would benefit from contributing to a group effort, they fail to do so because they fear that others will not contribute. This is closely related to the **free rider problem**.

**Collective good:** A good, service, or outcome that benefits everyone in a particular group.

**Common knowledge:** A shared idea about how to solve a **coordination problem**.

**Common metaknowledge:** Knowing that others have the same understanding you do about how to solve a coordination problem.

**Common pool resource:** A resource that is reduced when people use it (i.e., high **rivalry** or high **subtractability**) and that also is difficult to prevent others from using (difficult **excludability**).

**Conflicts of interest:** When what is best for one actor differs from what is best for one or more others. For example, the **collective action dilemma** is a conflict of interest caused by the **free rider problem**.

**Cooperative partner choice:** The ability of people to choose the people they cooperate with.

**Coordination game:** A game that models the key features of a particular **coordination problem**.

**Coordination problem:** A situation in which people would benefit if they were to cooperate, but they fail to do so because they lack **common knowledge** about how to do so as well as **common metaknowledge**.

**Division of labor:** When different people specialize in different tasks. This is closely related to **role specialization** and **hierarchically-organized task groups**.

**Empathy:** The ability of people to feel what others are feeling.

**Excludability:** How difficult it is to prevent someone who has not paid for access to a good or contributed to its creation or maintenance from consuming it anyway.

**Expressive benefits:** **Selective benefits** consisting of the pleasure people experience when they express themselves by participating in the creation of a **public good**.

**Free rider problem:** The temptation people feel in collective action dilemmas to let others do all or most of the work while still receiving the benefits of that work.

**Game of Chicken:** A **coordination game** in which there is a large **conflict of interests**. See the appendix for details.

**Hierarchically-organized task groups:** Small groups with specialized assignments that fit together in a larger organization.

**Material benefits:** **Selective benefits** that are physical rather than emotional, such as money or a newsletter.

**Mentalizing:** See **theory of mind**.

**Perspective-taking:** See **theory of mind**.

**Positive externality:** A side effect of someone's behavior that benefits someone else. This is closely related to **byproduct mutualism**.

**Positive sum game:** A game in which it is possible for everyone participating in it to benefit, although not necessarily equally.

**Prisoner's Dilemma Game:** A game consisting of a two-person **collective action dilemma**. See the appendix for details.

**Public good:** A good, service, or outcome from with high **excludability** but low **subtractability/rivalry**.

**Pure coordination games:** A coordination game in which there are no **conflicts of interests** at all, so that what is beneficial for one player is equally beneficial for the other.

**Rivalry:** See **subtractability**.

**Role specialization:** When people divide up a task by focusing on specific aspects of it. This is closely related to division of labor and **hierarchically-organized** task groups.

**Rowing Game:** A pure coordination game. See the appendix for details.

**Sculling Game:** A game consisting of a two-person **collective action dilemma**. See the appendix for details.

**Selective benefits:** Benefits that come only to actors who contribute to the creation of a **public good**.

**Signal of commitment:** A sign that a person is definitely committed to a particular course of action, such as contributing to the creation of a **public good** despite the **free rider problem**.

**Snowdrift Game:** A coordination game in which there is a large **conflict of interests**. See the appendix for details.

**Social coordination conventions:** Ideas about how to solve **coordination problems**.

**Solidary benefits:** **Selective benefits** consisting of the good feeling people sometimes get from working together to achieve shared goals, such as creating a **public good**.

**Stag Hunt Game:** A pure coordination game. See the appendix for details.

**Subtractability:** How much one person's consumption of a good prevents others from also consuming it. This is closely related to the concept of **rivalry**.

**Theory of mind:** The ability people have to imagine what is happening in some other person's mind, such as what they know or don't know or what their goals or intentions are. This is also sometimes called **mentalizing** and **perspective-taking**.

**Tragedy of the commons:** When a **common pool resource** is used up because it is difficult to prevent people from using it.

**Zero sum game:** A game in which one person's winning necessarily entails someone else losing.

## 8. Suggested additional reading

Axelrod, Robert. 1984. *The Evolution of Cooperation*. New York: Basic Books.

A classic in the scholarly literature on cooperation that is also very readable.

Binmore, Ken. 2007. *Game Theory: A Very Short Introduction*. Oxford: Oxford University Press.

An easy, quick introduction to game theory.

Chwe, Michael Suk-Young. 2001. *Rational Ritual: Culture, Coordination, and Common Knowledge*. Princeton: Princeton University Press.

This short, readable book explains why we need not only common knowledge but also common metaknowledge to solve coordination problems.

Cronk, Lee, and Beth L. Leech. 2013. *Meeting at Grand Central: Understanding the Social and Evolutionary Roots of Cooperation*. Princeton: Princeton University Press.

Dr. Leech and I wrote this as a summary and critique of the scholarly literature on cooperation in the biological and social sciences as of 2012.

Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press.

This book explains on how communities sustainably manage such common pool resources as fisheries, irrigation water, pastureland, and forests.

Ridley, Matt. 1997. *The Origins of Virtue*. Penguin UK.

A popular introduction to the evolutionary biology that underlies cooperation.

Sawyer, R. Keith. 2005. *Social Emergence: Societies as Complex Systems*. Cambridge: Cambridge University Press.

This book is about the spontaneous emergence of social coordination conventions. The author has special expertise in an unusual but very interesting type of cooperation: Improvisational comedy.

Sutton, Robert I. 2010. *The No Asshole Rule: Building a Civilized Workplace and Surviving One That Isn't*. New York: Business Plus.

As the title suggests, this book contains some practical advice about the choice of cooperative partners.

### 9. Appendix: Formal versions of the games

Although games can involve many players, it is easiest to think only about two-player games. The conventional way to present a two-player game is like this:

		Column Player	
		Choice #1	Choice #2
Row player	Choice #1	Row player's payoff, Column player's payoff	Row player's payoff, Column player's payoff
	Choice #2	Row player's payoff, Column player's payoff	Row player's payoff, Column player's payoff

The payoffs are represented by numbers. You can think of the numbers as money or anything else in which larger numbers represent greater benefits than lower numbers and negative numbers represent bad outcomes. The first number in any box is the row player's payoff, and the second number in any box is the column player's payoff. If the game is symmetrical, then you don't need to worry about who is the row player and who is the column player because the payoff structure will be the same whichever way you think of it. All of the games described in this manual are symmetrical games.

The Sculling and Prisoner's Dilemma Games have different choices but the same payoff structure:

		Column Player		
		Pull on oars	Don't pull on oars	
Row player	Sculling → version ↓	Prisoner's Dilemma version ↓→	Cooperate	Defect
	Pull on oars	Cooperate	3,3	0,5
Don't pull on oars	Defect	5,0	1,1	

The Rowing Game and the Stag Hunt Game also share a payoff structure:

			Column Player	
	Rowing → Game version ↓		Pull on oars	Don't pull on oars
		Stag Hunt version ↓→	Hunt stag	Hunt hare
Row player	Pull on oars	Hunt stag	7,7	0,5
	Don't pull on oars	Hunt hare	5,0	5,5

Here's the Battle of the Sexes Game:

Husband	Wife		
		Football	Ballet
	Football	5,3	1,1
Ballet	1,1	5,3	

The Game of Chicken and the Snowdrift Game have the same payoff structure:

			Column Player	
	Chicken → version ↓		Swerve	Drive straight
		Snowdrift version ↓→	Dig	Don't dig
Row player	Swerve	Dig	3,3	1,5
	Drive straight	Don't dig	5,1	0,0

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