Some variants are easy to create: two-player games can often be converted into two-sided team games by allowing multiple players to share a side. A two-sided team game such as Werewolf or World of Warcraft battlegrounds can be made into a multiplayer nonteam game by assigning one point to each person on the winning team, randomizing the teams every round, and declaring the person with the highest point total at the end of the session the overall winner.\textsuperscript{19}

Two common ways of creating multiplayer games are by having several players simultaneously play one-player games more or less independently, or by adding more players to a two-player game. We term these races and brawls respectively, and discuss them at length in the next chapter.

For games that do allow varying numbers of players, which variant is preferred is necessarily (being a player preference) agential, but systemic influences are important.

In face-to-face play, two-player variants (or one-player variants, if they exist) often have the edge over multiplayer variants simply because of the ease of assembling a smaller number of players. With computer games, even those for which the 2+ player versions are considered the “standard,” the majority of play may occur in the single-player campaign; this is common for RTS games. It’s much easier to assemble one player (yourself) for a computer game than it is to go online to play. Once you do go online, though, getting several players together isn’t that much harder than finding a single opponent, so multiplayer variants are quite common. But hardcore players, if the multiplayer variants are highly political, may wind up preferring the two-player version (see section 2.3, on politics).

Exercise 1.5: What is the minimum number of players in a game of werewolf? (Hint: How low can you go before the game is predetermined?) Maximum? Sweet spot? Why is this the sweet spot? What is the number of sides in werewolf?

Exercise 1.6: Name some games you’ve played with a variable number of players. Name some two-sided games you’ve played with a variable number of players.

Exercise 1.7: Can you name a party game with a fixed number of players?

1.3 Characteristic: Heuristics

Many games, in order to satisfy players, need to allow players to gain mastery in the game over time.\textsuperscript{20} Players typically gain skill by developing heuristics: rules of thumb that help them play the game.\textsuperscript{21} Some of these rules might be quite concrete (“never draw to an inside straight” in poker) and some might be fairly vague (“develop your pieces” in chess).

Discussions among players after a game are often about heuristics—what moves were most effective, what decisions could have been made differently, what the correct winning strategies are. “Monday morning quarterbacking” and other postgame analysis from spectators also tend to be about heuristics. And if someone asks “how do you play that game?” and they already know
something about the rules, chances are they are looking, not for even more detailed rules, but for some basic heuristics. So although they may not use the term heuristics, players of games are very much concerned about heuristics, and discuss them all the time.

As an extreme example of the lack of heuristics, consider a game we’ll call “Guess the Digit.” Each round, we have a computer pick a random number between a million and a billion. We then each try to guess that digit of pi; whoever comes closest wins. This is a deterministic game (once the computer has picked the digit), but there are no apparent heuristics, so the game is essentially random for its players. Most people would have little interest in playing this game—anyone who wanted to play a purely random game would probably prefer rolling dice or flipping coins. Perhaps if one knew enough about the distribution of the digits of pi, there might be some useful heuristics, and the game might become more interesting. But as it is, it’s not much of a game, due to its lack of heuristics of any kind.

Figure 1.3
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It’s useful to distinguish two kinds of heuristics:

Positional heuristics These are heuristics that evaluate the state of the game—that is, tell you who’s winning. Examples include seeing how many people are ahead of you (and by what distance) in a race, or counting the point values of the pieces on each side in chess.

Directional heuristics These are heuristics that tell you what strategy you should follow. Examples include rules like “run as fast as you can once you see the finish line” or “try to control the center
squares."

For those familiar with boardgame-playing AIs, these can be thought of as board evaluation algorithms and move generation algorithms respectively.

Playing well in a game involves using these two kinds of heuristics in conjunction. The two kinds of heuristics are of course related—for example, one simple directional heuristic is “make moves that, when I apply my positional heuristics, look good.” Note in particular that if you have no useful positional heuristics (i.e., you can’t tell which game states are good for you and which are bad), it’s hard to develop any directional heuristics at all. On the flip side, “I’m winning if I’ve achieved a lot of my directional heuristic goals” is a possible state heuristic.

Although in general positional and directional heuristics support each other, exceptions are possible. Consider the following two games, “Money in the Bag” and “Money on the Table.” In Money in the Bag, each player has access to two buttons, a red one and a blue one. Pressing the red button gives a player one dollar 80 percent of the time; blue gives one dollar only 20 percent of the time. Any money a player receives goes into a bag, and the contents of the bag are only revealed at the end of the game. Each player receives ten presses. This game has powerful directional heuristics—“always press the red button!” is a perfect guide to play. But there are no state heuristics: which player is ahead is an utter mystery until the end of the game.

In Money on the Table, there is no bag; any money gained is placed on the table in front of the respective players. However, one button gives a dollar 51 percent of the time, the other only 49 percent of the time, and players don’t know which is which. This game has very clear state heuristics (the amount of money on the table), but essentially no directional heuristics (players won’t be able to deduce which button is which).

Besides heuristics, depending on the game, a greater or lesser amount of specific physical skills (running fast, aiming at onscreen targets using a mouse) may also be involved, as may a certain amount of reading out moves (if he goes there, and I go there, and then he goes there, what do I do then?).

Our focus, though, is not on how to win games. Why, then, are we concerned with heuristics? The answer is that for players to have fun, they need to have (not necessarily conscious) heuristics. Human beings playing games need to know if they are winning or losing, and they need to know what they want to do next. We say a game has “good heuristics” if there are heuristics available to the players that let them do these things. Note this is very much dependent on the player base as well as the structure of the game itself.

The phrase “good heuristics” is quite general, and it’s important to ask “good in what sense?” Heuristics can be:

*Clear vs. muddy* How easy is it to understand and use the heuristics?

*Rich vs. sparse* How many heuristics does the game have? Do they cover most of the situations that arise in actual play?

*Satisfying vs. unsatisfying* Do players find the heuristics enjoyable to execute, or do they seem more like work than fun (highly agential,
of course)?

**Powerful vs. weak** Do the heuristics provide a great deal of help in winning, or do they just nudge the heuristic user’s chances up a bit?

In general, when we use the phrase “good heuristics” we mean good for the game, in the sense that their presence makes the game more enjoyable. That includes being clear, rich, and satisfying, but it doesn’t necessarily mean being powerful. Players who want to win will naturally seek out the most powerful heuristics they can, and in that sense they might think of powerful heuristics as “a good thing,” but having extremely powerful heuristics may not be good for a game. Indeed, if the heuristics are too powerful (as in Nim or tic-tac-toe, where the heuristics tell you everything you need to win), they will be bad for players’ enjoyment of the game. We discuss this topic further below.

**Climbing the Heuristics Tree**

A great deal of enjoyment in a game is especially for more serious players, comes from the process of “climbing the heuristics tree”: learning successively better and more sophisticated heuristics for a given game. For a more “serious” game, say chess, this process of learning is arguably the main appeal of the game. Of course, this learning and skill-gaining process is inextricably intertwined with the process of winning more often, at least against an imaginary fixed opponent. In practice, one often tends to find opponents of one’s own level, and thus win roughly the same ratio of games, so the improvement may come from being able to beat better and better opponents.

For sports, and for computer games that rely heavily on reflexes, the heuristics are only part of the process of improvement, and specific physical skills are a large part of one’s ability at the game. In a sprint, say, it’s almost entirely physical skill, but of course there are many sports where heuristics play a larger part. Sometimes the heuristics are not so much at the individual-player level, but at the level of the coach or team manager. Even if the heuristic operates at an individual level, it often must be thought of in advance, trained repeatedly, and then performed automatically during an actual match (think, say, of fencing).

But for games without physical skill, which includes many computer games and almost all boardgames and card games, one’s improvement at the game is based on one’s improvement in heuristics.

**Heuristics at Different Skill Levels**

Like most game characteristics, the heuristics of a game will be perceived differently by players of different levels of skill. In go, the heuristics are very unclear to a beginning player: they cannot tell who is winning, and they are often at a loss for what to do. In fact, beginners often have difficulty telling if the game is ever over or not. Chess has excellent heuristics for absolute beginners (checkmate the other player’s king, or failing that take his better pieces) and for advanced beginners (make advantageous trades according to the point value system, develop your pieces, control the center). But intermediate players may reach a state where they feel they are simply avoiding moves that are obviously bad, waiting for their
opponent to err—the intermediate-level heuristics for chess are not as friendly. Indeed, chess is sometimes described as the game where the winner is the person who makes the second-to-last mistake. Intermediate go players have a much easier time finding profitable moves, since many moves will increase one’s score at least somewhat.²⁸

In some games, there are heuristics of sufficient quality that, once known, players can play perfectly (the game is “solved”). Tic-tac-toe is one such game (although arguably this is more a matter of reading out the game tree than heuristics per se). A better example is Nim. Note that for Nim, there are not many good heuristics for levels of skill below the complete solution. Thus Nim isn’t really a very fun game—it has an excellent one-time metagame for the mathematically inclined (figure out how to solve Nim), but it is hard to play an interesting game of Nim before you figure out the solution, and impossible to play an interesting game once both players know it. In particular, it is basically impossible to know anything at all about the state of a multiple Nim game until you have entirely solved Nim.

As an aside, note that the possibility of a game having heuristics so powerful that the game is “solved” does not depend on the game being deterministic. One could construct a game “rando-Nim” where two players played Nim, and then a die was rolled to see who won (say 1–4 the winner of the Nim game, 5–6 the loser). Once the players understand Nim heuristics, this becomes a purely random game, but its strategy and its heuristics are the same as those of Nim.

What Makes for Good Heuristics?

There are a number of different axes on which one can measure the quality of a game’s heuristics.²⁹ Ideally:

• Heuristics exist at all levels, from beginner to advanced. Players should be able to improve at the game by acquiring increasingly sophisticated heuristics.

• Some heuristics should be easy for players to discover on their own; others need to be more difficult (if they are all easy, eventually they will all be discovered and the game will be exhausted) and will typically be learned from other players.

• The set of heuristics should be powerful enough to cover most situations (so that the player is never without guidance) but not so powerful as to completely cover more than a few situations (lest those situations, or worse yet all situations and thus the game itself, be “solved”).³⁰

• The heuristics are “satisfying” in the sense that the player feels she is exercising judgment using rules of thumb, rather than executing a computer program. The Nim heuristic or a memorized chess opening is not satisfying in this sense; “develop your pieces” or “bluff occasionally, so that other players will call you when you do have the best hand” is. One common way for a heuristic to be unsatisfying is for it to be completely deterministic, eliminating judgment; another is for it to involve a great deal of calculation (see the discussion in section 6.5 on reward/effort ratio).

Beginner heuristics, also called “zero-level heuristics,” are particularly
important. Players who first learn the game need to have some idea of what they are trying to do and how they might go about it. Even heuristics that look quite ineffective from an advanced player’s point of view may serve, since beginners can use them against other beginners and hope over time to improve their heuristics. But with no good zero-level heuristics, the game may be so unenjoyable the beginner simply gives up. Games with good zero-level heuristics include Uno (even out your suits) or even bridge (win a trick with the lowest card you can, bid what you can make\textsuperscript{12}). Games with bad zero-level heuristics include go and some European boardgames, where there are often a plethora of options with no one obviously better than any other (“silk costs more, but gives me more victory points, compared to wheat... which should I pick?”). In general, any game with a large number of options, carefully balanced to preserve gameplay variety for advanced players, runs the risk of damaging its zero-level heuristics. This risk is one reason one might want bad cards in a trading card game or bad items in an RPG: they provide zero-level heuristics, choices that even beginning players can make and improve their game.

If a game does have weak beginner heuristics, more advanced players can often help beginners get started by giving them some heuristics that are not too difficult to apply but that would be difficult or impossible for the beginners to discover on their own. Chess openings are an example of this kind of transmission at a somewhat more advanced level. At a more basic level, the relative values of the pieces in chess provide a simple and powerful heuristic for beginners. Too many of these transmitted heuristics, however, can create a burden on the memory.

**Heuristics and the Player Base**

As players gain skill at a game, the heuristics can change. Tic-tac-toe has decent heuristics if the player base is small children, but the heuristics are not good for the adult player base. Games like chess or go evolve over time as players learn more and develop better heuristics.\textsuperscript{22}

An interesting extreme example of heuristic dependence on the player base and development of heuristics over time is Dots and Boxes. Commonly played by schoolchildren, Dots and Boxes has slightly weak zero-level heuristics—for example, “move randomly except don’t complete the third side of a box.” But it has some good, reasonably easy to discover, intermediate-level heuristics that apply to its endgame (in particular, the trick of not taking the last two boxes in a long chain, thereby forcing your opponent to begin a new chain). The beginning stages of the game seem impossible to analyze—that is, there are no obvious positional heuristics, and play tends to proceed essentially at random. However, relatively recently, advanced techniques in theoretical mathematics (namely combinatorial game theory) have allowed one to play the earlier stages in a productive way.\textsuperscript{15} In other words, Dots and Boxes now has very interesting and powerful heuristics for a certain small player base, namely combinatorial game theorists. Schoolchildren, presumably, have chosen to continue as before.

**Exercise 1.8:** What are some first-order heuristics in werewolf? What gives werewolf so many basic heuristics?
these heuristics.

**Exercise 1.10:** What are some heuristics that bridge and hearts share?

**Exercise 1.11:** Name some games (besides go) with poor first-order heuristics. Why are they so poor?
2 Multiplayer Games

When a game has multiple players, many phenomena arise that are absent in two-player games. We discuss a number of them in this section. Most of them are, properly speaking, phenomena of multisided games: when a game has three or more sides, one side can be eliminated but the remaining sides continue to play, or perhaps two sides collude against the third (an example of politics), or perhaps the losing side picks which of the two frontrunners actually wins (kingmaking). It’s easiest, though, to think of these phenomena in games where there is just one player per side, and hence we normally speak (somewhat imprecisely) simply of “multiplayer” games.

Multiplayer games can allow a widely varying amount of interaction among the players. This amount of interaction will lead to critical differences in many aspects of play.

Some multiplayer (multisided) games can be categorized as races. Races are generally games built up from one-player games. Other games are best categorized as brawls, which are at their core irreducibly two-player games with extra players added. Many of the multiplayer characteristics of a game will come out of this distinction. In particular, races tend to have logical elimination (defined below) and low amounts of interactivity, politics, and kingmaking; brawls tend to have high amounts of interactivity, politics, and kingmaking.

There are of course games that fall in between these two extremes. Typically they can vary between these two styles of play inside the rules, and agentially differ in how the gameplay is expressed. Purposefully constructed games can attempt to cut this line down the middle; RoboRally is one example. Some of the interest in playing such a game is seeing just how the play develops from session to session.

Although many multiplayer phenomena can be seen most clearly in games where there is one player per side (and three or more sides), there are, of course, many important games that do have multiple players on a single side. The most basic case is the two-sided team game, like soccer or bridge. In these games, issues of teamwork arise—what roles do the different team members play? How do they communicate with one another? And, as a special case, sometimes there is only a single side, and all the players are on it, winning or losing together. These are the cooperative games, such as Hacky Sack or (sometimes) World of Warcraft. They are, quite simply, the team analog of single-player games, just as two-sided team games are the team analog of two-player games.

It’s worth spending a bit more time discussing races and brawls before examining the multiplayer characteristics themselves.

Races are built by gluing together a number of copies of a one-player game, one for each player. Each player is pursuing her own victory condition. A footrace, Scrabble, and golf are all races. Although there are multiple players, one can imagine the race taking place with just one player (perhaps with some rules tweaks).

Brawls are built by taking a two-player game that is not built up from one-player games and adding more players—think, for example, of adding more players to chess. Risk and free-for-all Starcraft are examples of brawls. There are few if any examples from classic games and sports, for reasons we will discuss below. Unlike a race, it is hard even to imagine reducing a brawl to one player.

The winner of a race is typically determined by some sort of scaled
performance: a point score, time, or distance. Often players cannot affect each others’ progress much.

The winner of a brawl is typically determined by some variant of “last-person standing”: the players knock each other out of contention. Players definitely can affect each other’s progress, and indeed much of the gameplay centers around just that.

Many games do not fit this distinction well, in particular poker and many other card games. Gameplay will tend to follow not this categorization of construction, but rather other underlying characteristics such as amount and type of interactivity, type of elimination, and amount of politics. Our focus will be on these basic characteristics rather than general form.

2.1 Characteristic: Player Elimination

In a game, players can be eliminated: they’re out of the game, but the game continues. Players can be eliminated strictly, in the sense that they are entirely out of the game, or logically, in that they have no chance of winning although they continue to play (in a sports season where the object is to make the playoffs, this is usually referred to as “mathematical elimination”). Being out of a game is generally less fun than being in it (or one would not play); being in a game but having no chance to win is often even less fun than that. So how a game handles player elimination can make a big difference to the enjoyability of the game.

Figure 2.1
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One can also speak of effective or perceived elimination: where a player has a chance to win that is extremely low, but not quite zero, so that she is effectively eliminated, or she thinks of herself as all but eliminated. Such a measure is highly subjective, of course—different players in the same game, or the same player at different times, may perceive the same game state in different ways. The nature of the game itself matters a great deal as well—a player in a lottery might see himself as very much in the running with a less than 1 percent chance to win, whereas that same player might feel effectively eliminated in a chess game where he had the same chance. Players who perceive
themselves to be eliminated may be unhappy to continue the game, and they may resign if the game rules (either written rules or social conventions) permit.

One-Sided Games

The situation here is basically equivalent to that of two-sided games (below). Note that computer players are generally quite bad at conceding appropriately, though. In some computer games (e.g., Civilization) the distance between logical elimination and strict elimination of one’s computer opponent can be disarmingly great. In one-sided games where the human player perceives himself as eliminated, there is essentially no social pressure against resigning. The effective elimination problem is in some sense halved.

Two-Sided Games

The analysis of player elimination is quite different depending on the number of sides. In a two-sided game, strict elimination poses no special problems: the game is over, and someone has won. A new game can now be started if the players wish to continue playing.

One exception occurs with two-sided team games, where it's possible to be out of the game (perhaps because of injury in a sport, or the elimination of all your units in an RTS) while your team plays on. As in any case of strict elimination, the eliminated player is converted into a spectator, but in this case he is a more interested spectator, since his team is still in the game.

Logical elimination can be an issue with two-sided games, but there is an easy solution: the eliminated (i.e., losing) player can concede. If the losing player does not concede, the game is now pointless for both players, at least from the point of view of winning. So why would the losing player not concede? There are at least three possible reasons.

First, the losing player may not understand that he has lost. He might feel that he is merely behind but still with a chance to win. This is most likely to occur in games with a great deal of skill where the less skilled player is behind. (It can also occur in games with hidden information, where the losing player doesn’t see the information that would let him understand he is losing.) His positional heuristics may simply be inadequate. This will be somewhat frustrating to the more skilled player, but the less skilled player feels he is playing a real game, so it’s not especially frustrating to him (other than the frustration he’ll feel for losing).³

Second, the losing player may simply be stubborn or feel that it’s “right” to “finish the game.” In fact, in some playgroups, this may be the preferred or expected behavior. On some level, the feeling that a hopeless game should be played to completion (or more generally, how hopeless a game has to be before conceding makes sense) is just a social convention. If both players share the same understanding, it’s not often a problem; if players have differing views (especially common online), frustration can ensue. It is interesting that some classic games that often have an especially long period of effective elimination have developed extensive cultures of resignation. Chess provides the best example of this. The game has solved this problem agentially over time, and clear deviations from accepted resignation standards in competitive play can be the source of scandal.

Third, the losing player may understand that it is annoying to the winning player to be forced to continue playing, and deliberately draw out the game to frustrate her. This is less common in games among
friends (in part because friends presumably are less likely to want to annoy each other, and in part because anyone who gets in the habit of playing this way will find whatever friends he has remaining are unlikely to want to play games with him). It is more common in tournaments. It is even more common online, where inhibitions against antisocial behavior are few, and where losing players can even hope to get a win by concession from their frustrated opponent. In RTS games, it can take the particular form of “hide the farm”: a defeated player will build a small building in an out-of-the-way place in the hope that it will take the winning player a long time to find it (see the discussion of grieving in section 7.5).

In environments where losing players are likely to draw out games, it’s usually best if the game mechanics allow a winning player quickly and easily to turn a logically eliminated player into a strictly eliminated one. Automatically revealing hidden buildings of an RTS player who has no army and no economy is one example of such a mechanic.

Multiplayer Games

When one player is strictly eliminated, the others typically keep playing. On the one hand, this can be seen as a bad thing: the eliminated player is no longer able to have the fun of playing the game. If the game takes a long time for the remaining players to finish, the eliminated player may well decide to go do something else and thus not be available to join the next game, leading the session to break up.

On the other hand, the alternative is often for that player to be logically eliminated, which can be worse. Race games, such as Scrabble, are particularly prone to this—the simplicity of the race game positional heuristic makes it easy to see that you have no chance. Playing a game when you have no chance to win is frustrating. And if you are strictly eliminated, at least you can go to the bathroom, get a snack, or simply relax for a few moments. The length of time until the next game starts is probably the largest factor in how annoying players will find it to be knocked out of a game (beyond, of course, the annoyance of losing). In poker, people sit out hands all the time and it’s no big deal because the next hand starts quickly. In Monopoly or (multiplayer LAN) Starcraft, players may sit out for quite a while.4

In party games, where people are more focused on being together socially and relatively less focused on the game itself (and who is winning it, and by how much), strictly eliminating a player is especially costly. So avoiding strict player elimination in party games is especially important, particularly if long wait times are involved, and logical elimination, while still bad, is perhaps not quite as bad as it would be in a more competitive game. Monopoly used to live in the party game space but has to some extent been supplanted by games like Pictionary and Trivial Pursuit; long wait times for eliminated players may be part of the reason.

Although being strictly eliminated is often preferable to being forced to play while logically eliminated, far better is not to be eliminated at all. Many games are designed to allow players, even ones who are clearly behind, still to have some chance to win. Trivial Pursuit, for example, although it is a race game, has no upper limit to how far one can progress in a single turn. Thus any player has a chance of taking the lead at any point.5

One variant that is occasionally used is to eliminate the winners: in card games where the object is to eliminate one’s hand, such as Old Maid, people stop playing once they have won, and the potential losers
continue to play. In a footrace, players drop out of the race beginning with the winner. The same considerations (e.g., keeping wait times short for those sitting out) still apply, but the annoyance of elimination is considerably lessened psychologically by the reward of winning. Ending the game with the elimination of a single loser is another possibility; see section 3.3 for further discussion.

Overall, though, a game tends to be faced with three basic options, each of which carries its own risks:

1. **Strictly eliminate players.**
2. **Logically or effectively eliminate players.**
3. **Give everyone a chance to win until the very end.**

The first option, common in brawls, risks making the eliminated players unhappy. The second, common in many games, risks making them unhappy (once they realize their state) and leaves them in the game where they may disrupt play for others. The third is tricky to do, and may lead to a game where only the very last portion of the game is relevant.

**Playing for Points**

Some games, bridge for example, track points in each subgame, so that a player cares how much he loses by. That means there is no logical elimination (or, if you prefer, that logical elimination’s pernicious side effects are avoided), because it is always valuable for a player to eke out a few more points even if he is fated to lose that particular subgame. Without the pressures of logical elimination to drive it, strict elimination becomes unnecessary in such games as well, so elimination in general is pretty much a nonissue.

Games played for money are particularly good examples of how a point system can prevent the problems of logical elimination. Money can be thought of as a point-tracking mechanism that matters even after the game is over, so that no matter how far behind you are, you still care about playing as well as you can. In poker, even if you have no chance at having the most chips at the end of the night, you still care about how you do in those last few hands.

Informally, players who are losing in games with logical elimination may play in an analogous fashion, playing to do as well as possible according to some simple positional heuristic, usually score or distance along a track. For example, in Scrabble a player who may have no chance of getting the most points, and thus winning the game, will probably be playing to get as many points as possible anyway. (Of course, it’s hard to play this way in games without simple positional heuristics.) This way of playing allows players who are losing still to find some meaning in their choices and in their play of the game, and thus presumably to find some enjoyment despite being logically eliminated. Sometimes this behavior will be called “playing for points” (if the game has points) or “playing for second” (or third, etc.).

In a game that allows for this sort of play, it is often an unspoken social convention that players should play this way if they are logically eliminated. If a player who has no chance to win forgoes this style of play and instead chooses to focus on affecting the play of other players in an attempt to determine which other player will win the game, the group will not be pleased. Such play is called “kingmaking” and is discussed below.

**Online Play**
The logic of player elimination shifts somewhat with online play.

Some things get worse: many kinds of behavior that are fairly rare in face-to-face gaming become more common online. For two-player games, the additional problems are enough to take player elimination from a relative nonissue in paper gaming to a moderately serious one in computer gaming. “Hide the farm” and other failures to concede are the most obvious examples.

Some things get better: strict elimination can generally be solved by having the eliminated player immediately begin a new game. This solution comes with its own set of problems, though: repeat play with the same group of people becomes more difficult, and players who are only losing by a bit may just quit to try again, leading to some unsatisfying games. Players that perceive themselves as eliminated generally have a much stronger recourse during online play than in physical play. They can either join a new game instantly or begin grieving the other players by remaining as long as possible. In many ways the effectively eliminated player has gained power at the expense of others. This can be an especially large problem if a player’s perception of his chances differ greatly from his teammates. He may leave a game still being contested, often dooming his side prematurely. Direct social pressure virtually eliminates this possibility in offline play. The anonymous nature of most online play provides challenges for designers struggling to use social structures to solve problems of effective elimination in the same way the chess community does.

Still, although the frequency of the various problems may be different, many of the fundamental issues are the same. And for some forms of online play, such as a group of friends wishing to play several games in a row, the situation can look very similar to face-to-face play.

Exercise 2.1: Describe the strict and logical elimination in werewolf. Describe the effective elimination.

Exercise 2.2: Describe the strict and logical elimination in Survivor. Describe the effective elimination.

Exercise 2.3: How much logical elimination is there in chess? Discuss the effective elimination in chess. How does it vary based on player skill?

Exercise 2.4: How much logical elimination is there in soccer? How much effective elimination? Why is resignation a common part of chess, but not soccer?

2.2 Characteristic: Interactivity

Games vary widely in their interactivity: the ability of players to influence the progress of players other than themselves. A boxing match, or a game of chess, is highly interactive. A footrace is almost entirely noninteractive. Note that we do not use the term interactivity the way it is used in computer gaming, meaning something like the reciprocal action of the player and the game system on each other (see chapter 6 of Salen and Zimmerman’s Rules of Play for extensive discussion).
This section introduces interactivity, and sections 2.3 and 2.4 on politics and kingmaking pursue the subject in more detail.

**Races, Brawls, and Interactivity**

In some games, each player is trying to achieve a result, and players can’t influence each other (or can’t do so very much). If a winner is declared in a race game, it will be based on some sort of score (often the score is time, i.e., whoever achieves a certain result first is the winner, but it may be some other score, as in golf). Classic sports races are the most common example, but many track boardgames, such as *Candy Land* or *Parcheesi*, are to some degree races. Any solitaire game with a score can be played as a race, with each person playing separately and the scores compared at the end; this is a common play pattern for arcade games. Such play patterns can serve as the basis for more interactive variants, as in the case of the card game *Spit*.

Even in games where players can’t directly influence each other, they often can react to each other’s progress by altering their strategy. A longer race, like a marathon or (in our sense of “race”) a golf tournament, is more likely to give opportunities for such a reaction. The reaction may simply be one of trying harder (physically or intellectually). On a more strategic level, the reaction usually takes the form of a press-your-luck strategy: when ahead, be conservative; when behind, risk falling even further behind in an effort to win. Examples of nonsports games that are essentially races and that have a strong press-your-luck element include *Yahtzee* and *Can’t Stop*.

Note that a game can be more or less of a race, just as an activity can be more or less of a game (and indeed this point of view applies to all our definitions). A sprint is very much a race, since players hardly interact at all. A marathon or a game of *Yahtzee* is essentially a race, but perhaps a less pure one since players can press their luck when behind.

Backgammon is somewhat like a race, in that both players are heading toward their own personal win condition. And after a certain point many backgammon games become a true race, with the opposing pieces having passed each other and no longer able to interact. But backgammon is somewhat like a brawl, in that the level of interaction is fairly high and players can capture each other’s pieces. It is hard to
think of chess as a race at all. Note that in backgammon one can imagine playing solitaire with no enemy pieces on the board, attempting to win as quickly as possible, something difficult even to imagine with chess.

Sometimes players are trying to interfere with one another directly, as in a brawl, and strong player interaction is built right into the system. Just as various game features can be added to increase interaction in a race (think for example of the shells in Mario Kart), limits can be added to a brawl to control its level of interaction. But in the absence of such limits, brawls will exhibit certain common features that we discuss in sections 2.3 and 2.4 on politics and kingmaking. And in the absence of added interactivity, races will not exhibit these features. So while the race or brawl core of a game may push it in a certain direction, ultimately it is the level and kind of interactivity that is telling.

**Targeted Interactions**

It is useful to break down the interaction between players not only by amount, but also by the degree of control over the interaction a player has. If a player has an opportunity to interact with another player, and that first player may choose which player to interact with, we refer to the interaction as targeted. A common example in a game with customized cards is a card that allows the user to choose another player and do something bad to him (typically take one of his assets, i.e., take one of his chips—see below). This distinction is obviously meaningless in two-player games, but it becomes very important in multisided ones, as we will soon see.

Note that despite the terminology, targeted interaction often is not negative to the player being targeted. The ability to trade with other players gives a positive game state change to the two trading. Scrabble provides another example, where playing long words and stretching the board might give an advantage to the current player and the one immediately following. In a three-player Scrabble game, depending on player skill and the board state, by deciding how defensively to play, one is effectively targeting one of the other players.

**Interactivity and the Number of Players**

The right way to think about interactivity depends very much on the number of players, or more precisely on the number of sides. Interactivity is at its most complex and most problematic in games with more than two sides, and, after a brief discussion of the simpler cases, that case is the one we will focus on, both in this section and the related sections to follow.

For true one-player games, there’s nothing to discuss—no other players means no one to interact with. For “one and a half” player games, discussions of interactivity run along the lines of such discussions for two-player games, with the imagined or computer opponent taking the place of the human one in the two-player case. A computer’s behavior, of course, will often be different from a human’s: computers are not good at conceding appropriately, but are otherwise unlikely to engage in griefing. The underlying level of gameplay interactivity will be about the same.

In two-sided games (of which two-player games are of course a special case), interactivity is relatively unproblematic, at least in principle. By and large, it’s good for the players to be able to influence each other, because it makes the game more interesting. If the players can’t influence each other at all, they might as well play solitaire.
against a set score, so why go to the trouble of finding an opponent for such a game? And indeed, two player races are rare. The vast majority of two-sided games are highly interactive—chess, soccer, fencing, a one-on-one Starcraft match, and Mortal Kombat, to name just a few.

In multi-sided games, as we will see, the situation is quite different.

**Exercise 2.5:** Describe the degree of interactivity and targeting in werewolf player interaction.

**Exercise 2.6:** Describe the degree of interactivity and targeting in Survivor player interaction.

**Exercise 2.7:** What is the degree of interactivity in (touing) bicycle racing? Why is this form of race no longer an individual event (the Tour de France started as an individual event)?

### 2.3 Characteristic: Politics

**The Chip-Taking Game**

Imagine a game, which we’ll call the “chip-taking game,” where each player starts with a pile of ten chips. Players take turns going around the table. On her turn, a player may take one chip from any player and discard it. The winner is the last person with any chips left.

Most people would not enjoy playing this game for long. There is no real skill involved, other than the skill of convincing other people not to take your chips. And even if you possess that skill, once the other players notice you have it, they will probably react by trying to eliminate you first.

Unfortunately, many multiplayer games reduce to the chip-taking game, in the sense that most of their game features are irrelevant for determining the winner, who is instead chosen ultimately in chip-taking fashion. All that’s necessary is that the game be highly interactive, in the sense that players can affect the positions of other players, and also that players can target whoever they affect. Players can simply choose to hurt (“take chips from”) the leader using whatever means the game offers. Even if the leader is highly skilled, he is unlikely to be able to withstand the onslaught of all the other players. Once the leader is eliminated, or at least knocked back from his leading position, the players can attack some new player.

As a simple albeit artificial example, suppose we modify the chip-taking game so that on a player’s turn, she chooses another player and plays a game of chess against him; if she wins he discards two chips, and if she loses he discards only one. This game has all the complexity and skill of chess, but it doesn’t matter. Kasparov is no more likely to win than anyone else at this game, and probably less; the other players are likely to choose him consistently until he’s eliminated.

**Targeted Interaction, Politics, and Voting Games**

Our previous observation can be restated: a game with a high level of targeted interaction will tend to be a chip-taking game. Note that both interaction (in the sense that players can significantly affect other players’ game state) and targeting (players can choose who they will affect) are necessary.
When players can target other players in an arbitrary way that differentially affects their game states, we refer to this as politics. The higher the degree of interaction (ability to affect each other’s game state) and the higher the ability to target specific players, the more political the game is. A game may have political mechanics inside it without its general character dominated by politics.

Some less obvious examples of political mechanics in games include the trading in Settlers of Catan or Monopoly. Here the players are not choosing someone to hurt, but rather someone to help. The politics arising from trading in these games are mitigated by the rules or by social convention and for most playgroups do not dominate the rest of the game.

Another way to describe a game with a lot of politics is as a voting game: the players are essentially electing a winner. As a concrete model, consider the game where in every round, players literally vote for someone to be eliminated, until only two people (who are the cowinners) are left.

Calling a game political, calling it a chip-taking game, or calling it a voting game are all broadly similar. A game with few restrictions on the amount or targeting of trading falls into this category as well. Political is the most general term; chip-taking emphasizes the ability of players to damage the positions of other players by targeting; voting emphasizes the fact that players are choosing a winner according to their tastes rather than that the game process is choosing a winner based on some combination of that winner’s skill and whatever luck may be inherent in the game.
Note that virtually no classic boardgames, card games, or sports fall into these categories; examples of highly political games are almost all from modern games. Perhaps this is because politics tends to be “evolved out” of games, or perhaps people’s taste in games is changing.

Also keep in mind that all these terms, and indeed this entire section, apply only to games with three or more sides. You can’t choose among opponents if you only have one opponent.

**Exercise 2.8:** Play “Truel” (tri-duel). In this game, three players take turns shooting a target of their choice. One player has an 80 percent hit chance, one 60 percent, one 40 percent. A player who is hit is out, and the winner is the last person left. Rotate who gets the first shot in each game. Play thirty or so games. What are the results? Are you surprised? What explains your results?

**Strategies Found in Political Games**

Political games and chip-taking games lead to certain common behaviors among players, such as

- Lying low so that players do not perceive you as a threat.
- Waiting while other players fight it out and then mopping up the pieces.
- Cajoling, whining, or begging other players not to hurt you.
- Offering out-of-game benefits (“I’ll get you a Coke”) or making out-of-game threats (“You’ll have to walk home!”) to influence other players’ behavior.
- Hurting the player who last hurt you (“revenge”).
- Threatening revenge in an effort to get another player to choose a different victim.

- Deliberately taking an action that harms another player but also hurts your own chance of winning, due to anger or in order to establish credibility as a player who will indeed avenge hurts (the latter may be thought of as a rational attempt to win more often in repeat play).
- Taking turns hurting other players, or deciding randomly who to hurt, perhaps to be “fair” or to reduce victims’ desire for revenge.
- Explaining to the victim why your choice was the rational one given the current game state (for reasons similar to taking turns above).
- Arguing that a player’s choice of you as the victim is not optimal, and that their chances of winning would be higher if they chose another victim.
- Arguing that some other player should “fall on the grenade”: make a sacrifice to stop the leader from winning (or getting too far ahead).
- Deliberately passing up an opportunity to stop the leader from winning when your turn comes, so that the last remaining player who has a chance to stop her is forced to “fall on the grenade.”
- Kingmaking: near the end of the game, a player who has no chance to win determining which of the players still in contention actually wins (discussed in the next section).

We will sometimes refer to these sorts of behaviors as “political.”

Note how generic these effects are, in the sense that they occur independent of the game mechanics of any particular game. If the game has targeted interaction, the above effects will occur. If the game has enough targeted interaction, the above effects will dominate the game, and in some sense all games with enough targeted interaction are the same game. One’s ability to win such a game will depend more on
one's skill with the above behaviors than with any skills specific to that particular game's mechanics.

Problems with Politics

If political games have a problem, it is not that political interaction is inherently uninteresting—although there are some players who play games hoping to avoid that sort of thing—but that it can overwrite the rest of the game. Skill at the game doesn't necessarily increase one's chances of victory, and in fact it may decrease it as one becomes more of a target for the other players.

If one considers games from the point of view of heuristics, the potential problems of political games are highlighted. Normal positional heuristics become largely irrelevant: if at any point any player can be "picked on" and eliminated by group consensus, how can one know what one's position in the game is? And if positional heuristics are irrelevant (or, more precisely, if positional heuristics relating to the mechanics of that particular game are replaced by general social heuristics involving predictions of who is likely to do what to whom), then directional heuristics (again, of other than the social kind) are likewise irrelevant.

Depending on the playgroup, climbing the heuristics tree in highly political games can be very interesting. Without a good grasp of the basic positional heuristics (those independent of politics), the effect of political interaction can be mitigated. Once a set of players has developed a good set positional heuristics independent of the politics, the game can often be reduced to a simple voting one, but that process of understanding who is in the lead and how to stop them is often an interesting one.

Games with targeted interaction are more prone to arguments. In a game without targeted interaction—a two-player game like chess, for example—there's no need to argue with someone that she is following the wrong strategy. If the other player is hurting herself, then so much the better for your chances. But if someone is taking one of your chips in a game with targeted interaction, it is to your advantage to convince him to take someone else's chip. Perhaps there are good reasons for him to take someone else's chip, and you need only make him understand that—and how frustrating if he does not! But if the game is very political, and his choice is essentially arbitrary, there is still some pressure on you to convince him to make a different, but still arbitrary, choice, a situation unlikely to lead to enjoyable or productive conversation.

Players' problems with politics can also be mitigated in situations where there is some consensus that a particular move is forced due to its clearly being the best option. For instance, consider a toy game where players on their turn can either add two chips to their total or take one away from another player. The game ends when any player gets to ten chips. If players A, B, and C have two chips each, and player A decides to take a chip away from player B, you are likely to hear complaints. If instead the chip totals are respectively two, eight, and two, and player A takes a chip away from B (whose turn is next), the social situation, for most groups, will be much different.

This toy game is illustrative of a not uncommon pattern of interaction in political games, namely players try to avoid interactions that affect another player differentially until they either feel they can win despite others' political actions against them or they feel they must interact negatively with a particular player, the leader, to have any
chance of winning.

To avoid misunderstanding, it should be mentioned that although political games commonly contain argument, discussion, or debate, these features are not the defining features of politics. A fast-paced game—say, a free-for-all RTS—may move too quickly to allow argument. But it still has politics because people can attack other players for arbitrary reasons: the basic ingredients of interaction and targeting are still there. And a two-sided game like werewolf/mafia has a great deal of discussion and argument, but no politics as we are defining it. With only two sides, there is no possibility of choosing an opponent, hence no scope for politics.18

Some Advantages of Politics

In general, we have been talking about politics as a bad thing in games, but in practice allowing room for political interaction has many excellent effects.

One advantage of political games, or political variants of nonpolitical games (such as free-for-all Magic or Starcraft), is that they can provide opportunities for low-skilled players to participate in high-skilled games (surviving and perhaps even winning because the high-skilled players attract more attention). While some highly skilled players may object in principle to this leveling of the playfield, in practice it allows them to play more games due to an increased potential audience size. Additionally it makes those games interesting, whereas otherwise they may not be, due to the natural dampening effect on skill that political interaction can have. Finding players to play games is generally speaking the hardest part of playing the average game, and anything that can increase the potential audience size is extremely valuable to both player

and publisher. This is an important effect in family games and children’s games, where the set of people playing a particular game is fixed and wide skill ranges are common. Mario Kart and Mario Party find much advantage in their limited politics as a way to keep multiplayer games interesting for a single family or friend group.

Political games tend to be exciting to the very end (on the downside, depending on the game design, they may drag on too long). The lead will change many times, as each new winner is picked on in turn. Any player has a chance to win (the flipside of this is that any actions other than those near the end of the game may not matter much). One can think of “pick on the leader” as a catch-up feature. Like any catch-up feature, it can become problematic when it is too powerful (see section 4.2 on snowball and catch-up), but it can be perfectly reasonable in small doses—many multiplayer games use it to good effect.

Some people just plain enjoy the social interaction, give-and-take, alliance making and breaking, and other behaviors that are common in political games. Since complex game mechanics tend to get wiped out by politics, it’s usually best to keep the game relatively simple for this audience. A good example is the boardgame Diplomacy: there’s no need to have countless kinds of military units and detailed combat simulations with charts and die rolls. Such details would only be washed out by the negotiations, alliances, and betrayals that are the real heart of the game.

Political games can be fun to watch, even if you don’t know the details of how a game is played: the ebb and flow of human social interaction is something everyone can relate to. Outrage and betrayal make for good theater as well. The TV show Survivor is just one example. (Survivor is an extreme example of kingmaking in particular:
there’s even an extra kingmaking step where strictly eliminated players are brought back to vote on the final winner!)

A key to understanding the place of politics in a game is understanding its audience. While classic games have evolved along with their player bases so there is a matching of political interaction with the stomach for it among the players, a new game needs to take this into account from the design. Is the game intended to be primarily for competitive players interested in differentiating their skill from one another? If so, it is probably best to keep politics to a minimum by making it two-sided, making it less interactive, giving players rewards for their absolute instead of relative finish, or hampering players’ ability to target one another specifically. For a more casual intended audience, politics can be a useful way of increasing the effective critical mass for play, since more widely varying skill sets can find interesting games together. Additionally, intensity of play is not nearly as much of a prerequisite for winning in a political game.

The Difficulty of Analyzing Strategy for Targeted Interaction: The Balloon Game

Picking on the leader is not politics in the narrow sense of the term (an arbitrary decision that does not affect one’s own chance of winning): it’s often a natural strategy of other players who are simply attempting to win themselves. But people’s intuition may lead them to pick on the leader more than they should, as the following simple game shows.

Three players, A, B, and C, each have a balloon. They each simultaneously choose an opposing balloon and throw a dart at it. Anyone whose balloon is popped is out (if all three hit or all three miss, everyone goes again). If only one person is knocked out the remaining two play for the win, repeating if necessary until one of the two wins.

Suppose A has a 60 percent chance to hit his target, B a 50 percent chance, and C a 40 percent chance. The “obvious” strategy is for each person to go for the biggest target (A aims at B, B and C both aim at A). This gives B a 19 percent chance to win. If B switches to C, though, then B has a 23 percent chance to win.

Exercise 2.9: Compute the above chances.

Thus if B takes the natural “pick on the leader” strategy, he actually gets worse results. Although the balloon game may seem artificial, many multiplayer game situations are not that different in broad outline: three players, one in the lead, and both of the players who are behind attack the leader. Depending on the details of the game, that may or may not be the correct strategy.

The player who is the leader, if he understands the situation, will be especially frustrated that the other players are conspiring against him, even to the point of their own detriment. He may argue against the other players’ actions, but will not necessarily be believed, for his arguments will appear self-serving (which indeed they are, although they are still correct—B is hurting both A and himself by attacking A, and C is the real beneficiary of B’s incorrect choice). Such a player will probably avoid chip-taking games.

Of some interest is the difficulty in analyzing real-world politics in a non-two-party system. This is analogous to the situation in the balloon game. The amount of power a given party in a parliament may have relative to its seats can be extremely deceptive. In the simple example of a single majority vote with parties of size 46 percent, 45 percent, and 9
percent, it is unclear which party holds the most power. Any two of these parties together can decide the issue, and presumably deals on future votes can be made, significantly equalizing their power despite their relative sizes.

Players with a detailed conscious understanding of political and chip-taking dynamics are rare, but many skillful players have at least some intuition that politics works against them. One can see this, for example, in RTS games, where “serious” players avoid free-for-all variants and prefer one-on-one games or two-sided team games.

Exercise 2.10: What do political games do to state heuristics in general?

Exercise 2.11: How much politics is there in werewolf? Why does it feel like a political game?

Exercise 2.12: If the state heuristics in a highly interactive two-player game are poor, how might this affect the politics in a multisided version of the game?

2.4 Characteristic: Kingmaking

Often in a multiplayer game, it happens that players A and B are in contention to win, and player C has no chance. If the game has any interaction, it may be that C is in a position to determine the winner by choosing which of the two players A and B to interact with. This is commonly referred to as “kingmaking.” This choice is necessarily political, in that C is assumed to have no choice of winning, and thus kingmaking, like politics in general, is a property of games with three or more players (or, more precisely, three or more sides).

The key ingredients of kingmaking are simply targeted interaction and the existence of logically eliminated players.

Players generally, and the player who was in contention but not chosen as the winner in particular, feel kingmaking is unfair. In some sense, kingmaking is all the problems of politics writ large: at a single moment, the very winner of the game is determined by the choice of a player not in contention, and all the skill and strategy (or luck) of the other contenders is for naught. Player dislike of kingmaking is a big reason to avoid logical elimination of players, either by always giving players a chance to catch up or by ensuring they are strictly eliminated once they are logically eliminated. And player dislike of kingmaking is a big part of the reason that virtually no competitive multiplayer games
are high interaction with a lot of scope for targeted interaction.

Highly political games will almost always have kingmaking. But it is possible for a game that is not otherwise a chip-taking game still to suffer from kingmaking. If a game includes many mechanisms to give players reasons to attack one player over another (e.g., resources that might be easier to seize from one potential victim than from another), a great deal of politics can be eliminated. But kingmaking may remain: once a player is out of contention, his in-game incentives to choose one victim over another largely vanish, and he makes a political decision whether he wants to or not (games played for money, or other ongoing point systems, are an exception). One example is a Swiss tournament, where a player who is out of contention can influence who makes the top eight by conceding to a player who is borderline—while a player is still in contention, she's hardly likely to concede to alter the fates of others, but after she's out of contention she may well do so.22

One example from "classic" sports is that of a commissioner for a league. It is quite common for a team to be logically eliminated toward the end of a season and effectively eliminated long before that. In the real world, teams are often given benefits for winning individual games beyond the benefits for winning or placing well within the season, such as revenue from increased attendance. In fantasy sports leagues, however, similar pressures are usually nonexistent, requiring a commissioner to approve all trades. Were it not for this, kingmaking could become a virtually insurmountable issue in those groups, as players who had no chance to win the season made unreasonably generous trades with friends who were in contention. In the world of physical sports, revenue pressures prevent such "giveaway" trades. In the fantasy leagues played face-to-face or among groups of friends, an agential pressure to "do your best" can inhibit them; but in online fantasy sports leagues a commissioner is needed.

Another less extreme type of kingmaking is blind kingmaking, where a player adds randomness to the choice of winner but does not preferentially choose a specific winner. Examples are poker, where a bad player in the pot will essentially give random presents to other players at the table, or Apples to Apples, where a player might decide to judge the winner (whose identity is unknown to the judge at the time of the decision) of a hand randomly rather than according to how well they have matched the target word. Kingmaking in many real-time computer games has a feel somewhat similar to that of blind kingmaking, because the choices happen so quickly and there often isn't time for real discussion beforehand (although somehow there always seems to be time for recrimination after the fact). Still, though, the decision was made deliberately, so negative feelings on the part of the victim can be high.

Factors Limiting Politics and Kingmaking

Politics in general, and kingmaking in particular, are common in multiplayer games because it doesn't take much for them to arise: all that is needed is the ability for players to interact, and a degree of choice as to the targets for the interaction. If these effects are strong enough, the game may reduce to a version of the chip-taking game, which may not be what the designers or players want. Thus many multiplayer games include mechanisms to inhibit politics in some way.

Of course, as we discussed above, there are advantages to politics in games as well as disadvantages. In small doses, there may be more fun than harm, and even extremely political games have an audience. But
having spent some time looking at factors that cause politics and
kingmaking, it makes sense to spend a little time looking at factors that
inhibit them.

One very basic way a game with many players can avoid politics is
by being a two-sided team game. There are many players, but with only
two sides, politics isn't a problem. Sometimes it makes sense for the
campaign to be about individuals competing, but for the games within
the campaign still to be team-based—for example, *World of Warcraft*
battlegrounds randomly assign people to teams for each game, but track
success over time on an individual level.

If a game has more than two sides, then limitations to the game's
politics come mainly from limitations to interactivity. Questions to ask
about the game include: How strong is the interactivity—that is, how
much can players affect the fates of other players? Are they limited in
which other players they can select as their victims? If they are not
much limited, do they at least have reasons to choose one victim over
another, reasons involving in-game benefits that accrue to the choosing
player?

The extreme example here is the race: no (or almost no) interactivity
allowed. Races are therefore not limited to two players, and as a
consequence often take advantage of this fact by adding players up to
other, usually physical, limits. Highly interactive games on the other
hand are almost always two-sided affairs if they have been played for
many years and achieved "classic" status. In a two-player situation,
there's no pressure to limit interactivity, so the greater interest in
interactivity triumphs (and those who don't want interactivity will
probably be drawn to one-player games). But in multiplayer games, one
way to solve the problems of interactivity is to have the game be a
race.

Relatively few games are pure races in the sense that there is no
player interactivity at all (sprints and bicycle time trials probably come
the closest). Very common, though, are games where the basic
structure is a race and some amount of interactivity is layered on top:
in *Parcheesi* you can blockade or send pieces home, in most European
boardgames you are accumulating points but your actions will affect
the availability of various point-accumulation strategies to the other
players, and in *Go Fish* players are racing to complete books but may
steal cards from other players. The higher the level of interactivity, the
less the game will feel like a race (a solitaire game where you are
looking over your shoulder to see how others are doing) and the more
it will partake of the phenomena we've been discussing.

If the game is at its core a brawl, it will be highly interactive. But
there can be limits to which other players a given player is allowed to
interact with—that is, limits to targeting. These limits can arise by
means of geography: in *Risk*, you can't attack anyone you please, but
only players your pieces are adjacent to. In *Quake*, you can only shoot
at players in the room with you. In *Magic: The Gathering*, a standard
multiplayer variant allows you only to interact with the players to your
left and right. And even a chess tournament can be thought of as a
multiplayer game where you are allowed to interact with only one
person at a time (namely your opponent for the current round), a
person you do not choose. Note that a mechanism like "you can only
attack those near you" is rarely chosen consciously, and is more often
the result of the flavor of the game (e.g., it's natural for weapons to
have a limited range). It's good to be aware of what game flavor is
doing to game mechanics, though. And if a designer wants to make a
game that strays from established conventions, this awareness is vital.

If players have a lot of choice as to who they can interact with, you can still control politics by giving them in-game benefits for interacting with specific other players. If a player attacks another player because she controls a lot of clay, a resource he wants, then he isn’t attacking someone just because she’s in the lead, or just because he doesn’t like her. And she’s less likely to feel picked on—after all, it’s “fair” that he’s attacking her, because he does want the clay.

Behaviors that involve hanging back and doing nothing are particularly pernicious, because if everyone engages in them the game grinds to a halt. In the absence of inducements to fight, hanging back can be tempting, because one can hope to mop up the weakened survivors. So it’s often good to have rewards for attacking other players. In Risk, you attack enemy players because you want their resources. Moreover, you are encouraged to eliminate them because then you get their cards as well. In free-for-all Starcraft, you might be inclined to hang back and let others fight; in Warcraft III, however, you might want to do some fighting so that your hero gains experience.

However, games with mechanisms to encourage players to attack one player rather than another may still be prone to kingmaking. A player who has no chance to win will be less likely to be influenced by whatever incentives are placed before him. So kingmaking might require separate controls, such as making sure that players who are about to lose won’t be able to influence the game too much, or ways to convert logically eliminated players to strictly eliminated ones (so they won’t be around for too long causing trouble), or at least a few mechanics that forcibly limit targeting.

Note that some mechanisms that limit the ability of losing players to affect the game don’t affect player interaction per se, but can still help limit kingmaking. If the game is highly skill-based, that can sometimes make a difference, because it can limit the ability of a losing player (who is presumably less skilled) to harm a player in contention—think of a Quake deathmatch, where a low-skilled player can do little to harm a high-skilled player. Even if lack of skill is not the reason a player is losing, sometimes the very fact of being in a losing position means one has less influence—think of an RTS, where a player close to elimination usually does not have enough power to influence the outcome (an exception might be a player whose economy is completely destroyed while he still has a large army in the field: this puts him in a position analogous to the aforementioned player who is out of contention at a tournament, with no chance of winning but nevertheless an ability to influence the tournament’s outcome).

Exercise 2.13: How much kingmaking is there in werewolf?
Exercise 2.14: How much kingmaking is there in Survivor?
Exercise 2.15: Give some examples of kingmaking in Monopoly.
Exercise 2.16: Give some examples of kingmaking in fantasy sports. What rules are instituted to combat this?

2.5 Characteristic: Teamwork

In games with several players, sometimes two or more of those players are on the same side—that is, they form a team. Players pursuing the same goals behave, of course, very differently from players pursuing opposing goals. In this section we discuss the dynamics among team
members, with a focus on the roles of the various players (how they each contribute to the team’s success) and on the communication between the team members.

![Image](https://via.placeholder.com/150)

Figure 2.5
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One important special case is the cooperative game, where all the players are on the same team and succeed or fail together. We will argue that the right way to look at cooperative games is simply as a combination of single-player games and team games. Neither single-player games nor team games are especially mysterious, although of course each type has its own special issues, and so cooperative games don’t have to be thought of as something mysterious either.

**Roles in a Team**

Players in a team game will potentially have all the desires they would in a nonteam game, such as a desire to win, or a desire to improve their skills by climbing the heuristics tree. But they’ll have a new goal as well: the desire to contribute to their team. A successful team game will need ways for all the players to feel they are contributing.

In part, what a player can contribute to a team’s chances depends on what role the game assigns to that player. Sometimes those roles are symmetrical: in *Counterstrike*, every player has the same game abilities as every other. Of course, players will bring their own strengths and weaknesses to the game, but in terms of the game’s mechanics, one player is like another. In *Team Fortress*, however, there are specific roles such as Medic or Scout, with different gameplay capabilities. We’ll have much more to say about the symmetry, or lack thereof, in players’ capabilities in section 3.5. For now, though, a brief discussion will suffice.

These roles within a team, when they exist, can be systemic, as in the *Team Fortress* example, or agential. Many team games, sports in particular, have roles (i.e., positions) that are not built into the rules, but nevertheless are so standard as to be considered very much a part of the game: in basketball, for example, the positions such as point guard or power forward have no special rules status. In soccer, the goalie has special status within the rules but all the other positions are agential.

In games with systemic roles, there may be additional agential roles layered on top of them. For instance, *World of Warcraft* classes such as Warrior, Rogue, or Druid are built into the system directly. Roles such as
tank, dps (damage dealer—the term comes from “damage per second”), or healer, however, are not as directly defined. One warrior might serve as a tank; another might focus on dps. Of course, the game in general and the classes in particular were certainly designed with roles in mind, so it is arguable exactly how agential the roles are. Still, the roles definitely have a different status than the classes, and they are arguably more fundamental: it might be better to think of a World of Warcraft “team” as a tank, a healer, two dps’ers, and a hybrid, than to think of it as a Warrior, a Priest, a Rogue, a Mage, and a Druid.

In deliberately designed games where different roles are built in, two common strategies can help each player feel she’s making a contribution. One is to balance the various roles, so that no one player contributes more to the team’s victory than another. The other is to give each role unique abilities, as in an RPG where one player can heal and the others cannot. If everyone can heal a little, but some are better than others, then the roles may still be different, but the feeling a player has that her contribution is unique will be less. How different to make the roles is tricky—certain functions may be so basic to the game (e.g., dealing damage in an RPG) that it is often best to ensure everyone is good at them; others (e.g., healing) can be given out to some and not to others; and sometimes one can look for small truly unique functions and parcel them out carefully (e.g., in World of Warcraft, Mages get teleportation; Druids get a special swimming form).²⁸

If all the roles are identical (i.e., there is only one role), then potential contributions are automatically balanced—every player has the same chance to contribute. Actual contributions, of course, will vary according to player skill. Everyone on the bowling team or on a Counterstrike team has the same chance to contribute, but the more skilled players will tend to contribute more.²⁹

If the roles vary, balance will take some work. The modern expectation is that this work will at least be attempted, and every contribution will be roughly equal (e.g., classes in an MMO or races in an RTS will be balanced). Sports, however, do not follow this logic: the quarterback contributes a disproportionately large amount to a football team, and a pitcher contributes an extremely large amount to a baseball team. And players who sit on the bench may, at least in any given game, contribute nothing at all. But even in sports, efforts are made to help give players a chance to contribute: mandatory rotation of batters in baseball, or the widening of the tennis court in doubles so that it’s harder for one person to cover the whole court.

One role deserving special mention is that of leader. Team leadership may involve a formal or an informal role, though even when there is a specific team captain, that role may not be specified by the rules system. (But it’s often associated with a systemic role—for example, the leader of the offense on a football team is often the player who plays the quarterback position.) The leader may be responsible for many things: helping train players before the game, making team decisions during play, or giving advice during the game. In organized sports, the leader may be someone who isn’t even a player: a coach. But almost any team game has—if the team has played together more than once—at least informal leadership, typically coming from the most skilled players. In large or complex teams, there will often be multiple leaders, typically with specializations: offensive and defensive coaches in a football team, or a guildmaster, several officers, and a raid leader in an MMO guild.
Cooperative Interaction among Team Members

Team games vary widely in the amount of cooperative interaction among the team members: the amount they can influence each other's performance. With a swim meet or a bowling league, each player is essentially playing solo, and a team score is calculated by combining the individual contributions. With doubles tennis, players must decide who goes after which ball and they must avoid colliding with each other, but each player still hits the ball for himself. With football or basketball, one player throws and another player catches.

**Exercise 2.17:** Give some nonsports examples of various levels of cooperative interactivity.

In and of itself, cooperative interactivity is a good thing, in the sense that interacting with teammates is something many people enjoy—humans are social animals. (Of course there are definitely those for whom the low level of interaction of a bowling league is just right; solitaire would be too little and basketball would be too much—as always, knowing your audience is key.) Also, team interactions introduce all sorts of interesting heuristics (should I pass the ball now, or keep it for myself? should I heal our damage dealer or save my mana to heal our tank later?). But problems can arise when the levels of such interaction are high. The situation is loosely analogous to the one discussed in section 2.2. There, the problem was that interactivity (among opposing players) of the wrong sort led to political problems like picking on the leader and kingmaking. Here, problematic cooperative interactivity tends to take the form of socially unpleasant interactions and of role usurpation, both of which we will now discuss.

In any team game, having good teammates will help you succeed, and bad teammates will hurt your chances. The impact of your teammates on your game experience, however, will vary widely depending on how much cooperative interaction the game has. If the game has very little (e.g., a swim meet), you can still give your best performance regardless of how your teammates perform. Bad performances on their part simply lower the team's overall chance of winning. But if you interact with your teammates a lot, you will be more frustrated if they don't perform well: you might throw the ball perfectly, but they still fail to catch it. At an extreme, there are games where a bad teammate is so punishing for the group that you'd rather play a person short than have him on your team; *Defense of the Ancients* (where a teammate who dies frequently will thereby “feed” experience points to the other team, making them more powerful) is an example. Such games tend to be very hostile to beginners and low-skilled players generally, and may develop unpleasant player communities.

There is a difference in the emotional experience of being a bad player on the chess team and being a bad player in the football team. This phenomenon is partly social (different sorts of people play chess than play football), but it is partly due to game design—if I do not castle when I should, your chess game still runs smoothly, but if I drop the ball you threw, you may be outraged. And indeed, the people playing *Defense of the Ancients* are probably more like the people who play chess—but they act worse to their teammates than any football player would.

When a team's performance is determined by combining individual results, as with a chess team or a fencing team, even when a teammate lets you down, you still have a clear scale of your own by which to
measure your performance. A player’s personal achievement isn’t disrupted by his teammate’s poor play. The more individual achievement can be culled from team performance, the less social pressure there may be on individual team members.

Professional sports can be thought of as individual competitive games since the players are individually competing for their next contract, to the consternation of owners, coaches, and fans. In this light personal statistical achievement at the expense of the team seems very reasonable. Part of the challenge of the coach is to align player and team goals as closely as possible.

Exercise 2.18: What other factors in Defense of the Ancients (or another unfriendly online game of your choice) make for a difficult team environment?

Telling Teammates What to Do

In addition to interacting via the play of the game, team members may communicate directly. Games often vary as to how much communication they allow, and may have special restrictions on communication. Bridge is the classic example: direct communication is forbidden—you can’t just tell your partner “I have the ace of hearts”—but signaling both in the bidding and in the play of the cards is extremely important and highly complex. Much of the interest in play is in the limitations on teammates signaling their individual hidden information. Tellingly, although hidden information is no longer an issue for one team once the dummy has been determined, information flow isn’t merely restricted, it is cut off completely. If it were allowed the better player would make all the decisions on offense by simply telling her partner what to do.

The problem of one’s role being entirely usurped, by having another player on your team tell you exactly what to do, is bad enough that no traditional game has it, but some deliberately designed games do suffer from it. Turn-based cooperative games are probably the most vulnerable, for reasons we’ll discuss below.

In modest amounts, having someone else tell you what to do in a game is acceptable, or even good. Coaches, team captains, or simply experienced players can make a game better for team members by giving advice. Of course, not all less experienced players will follow the advice they are given. Perhaps they fail to understand it, or they cannot execute it. Or perhaps they prefer to “go rogue,” trying to kill opponents rather than guard a position in an FPS or running around chasing the ball in soccer—pursuing individual glory rather than team victory. However, especially for teams of adults that play together regularly, players’ desire for victory, along with peer pressure, is usually enough to induce players to follow whatever expert advice may be available.

But if communication results in the expert telling the beginner what to do to the point of the beginner being effectively removed from the game, the beginner won’t have much fun. When does this effective removal happen?

Perhaps the most useful perspective is that it happens unless something prevents it—that is, the human desire to win and the greater skill of the expert will tend to push the expert into playing the game for the beginner unless there is some mechanism to stop it. Probably the most important mechanism is “skilled control”: physical skill like aiming or jumping that cannot simply be told to someone. If Kasparov
tells you to move your rook forward two squares, your making that move will be just as good as if Kasparov made the move himself. If Michael Jordan tells you to throw the ball through the round metal hoop, there is still something for you to do. Hence chess coaches are not allowed to give suggestions to their players during a game, but basketball coaches are.

Closely related to skilled control (arguably a special case of it) are time pressure and complexity. If a great many operations have to be performed quickly, there just is not time for an expert to direct a beginner to do each one. Thus in a team RTS game, an experienced player can give advice, but the performance of the other players still very much matters. With a turn-based game such as chess, though, exact instructions can be given and carried out.

Even for turn-based team games, all is not lost. Experts can be prevented from playing the game for beginners by having rules that limit communication. Hidden information, such as cards a player holds that teammates cannot see, prevents experts from knowing enough to advise beginners (of course, simply telling your teammates what you are holding must be prevented). For games where it makes sense, role playing can help as well: the know-it-all playing the wizard may tell you the optimal strategy for your barbarian, but you may feel free to ignore him as you charge into the enemies because it is “in character.”

Cooperative Games

Cooperative games are simply single-sided games with more than one player on that single side. Most if not all of the higher-level issues that arise in cooperative games can be found in some form in single-player games or in two-sided team games.

Limiting Experts’ Ability to Play the Game for Beginners

- Skilled control
- Time pressure
- Rules limiting communication
- Hidden information
- Role playing

Cooperative games were relatively rare until recently—almost all games either had two or more sides, or were single-player games. Most examples of cooperative games come from computer gaming, with a few examples (e.g., Pandemic or Reiner Knizia’s Lord of the Rings) from modern boardgames. Instances outside of these categories are few, but might include pairs figure skating, two people working on a jigsaw puzzle together, or Hacky Sack (perhaps also Dungeons & Dragons, depending on how you interpret the role of the dungeon master).

It is perhaps natural that cooperative games were rare until recently. An opponent provides so much, in terms of uncertainty of outcome and repeat play value, that having one is a big benefit to a game. If you simply cannot find one, then you will need to play a single-player game. But if you can find one or more other players, a game with opponents is probably your best bet.

All this changes with the advent of the computer. Now, the computer can be your opponent. It is still hard to get people together, but the advantages of having an opponent and the capabilities of the computer push games toward the “one and a half player” category. Add in
computer networking, so that other players are now easily available, and computer games naturally evolve in two ways: those new players become your opponents (as in most precomputer games), or they become your teammates against the computer—that is, you have cooperative games. Thus the existence of both AI opponents and computer networking allows games to offer the social benefits and heuristic challenges of team play, along with the greater than 50 percent average win percentages found in single-player games.

Although cooperative games can be seen as single-sided games with teamwork, some issues do loom larger because of the combination. For example, take the issue that some team games have of expert players playing the game for beginners. In a game like bridge, if one partner begins to tell the other what to do, the opponents will object. In a cooperative boardgame like Pandemic, there are no opponents to object when one player directs another. Granted, the player being directed may object, but the argument is less compelling: “I’d rather play myself, thanks” as opposed to “Hey, that’s cheating!”

Or take the problem of limited replayability to which single-sided games are sometimes prone. Like many single-player games, MMOs suffer from this problem, and the pressure on the content creators of the MMO is large. But the team nature of the MMO can amplify the problem, as players repeat content for the benefit of other team members. How many people would go on the same MMO raid as often as they do if not for the need to help their guildmates? Of course, on balance the additional interest generated by other players, especially teammates, more than makes up for these costs in a good MMO, but the point is that all these pros and cons can be understood as arising from issues pertaining to single-sided play, issues pertaining to team play, and the interactions between them.

Exercise 2.19: What are some roles in soccer? Which roles are supported by the rules? What about football? A relay race?

Exercise 2.20: Why are there so many team sports, but so few team boardgames?

Exercise 2.21: Choose three or four other broad categories of games (e.g., card games, arcade games) and discuss how often teamwork is found in games of those categories, and why. When there is teamwork, how much cooperative interaction is there? Why?

Exercise 2.22: Can you name any cooperative sports? How about cooperative card games?

Exercise 2.23: Choose four broad categories of games and discuss which are more suitable for cooperative play, which are less so, and why.

Exercise 2.24: Name some team sports where players frequently tell each other what to do. Name some others where advice giving is rarer. What about these sports causes them to fall into one group or the other?