

BIBLICAL GAMES

GAME THEORY AND THE HEBREW BIBLE



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► A NOTE FROM THE EDITORS

The following excerpt is taken from Chapter 6 (“Just Agreements and Wise Arbitration”) of Dr. Brams’ book, *Biblical Games: Game Theory and the Hebrew Bible* (MIT Press, 2003). The choice of this reprint would appear to be somewhat unusual to some readers, because it does not seem to deal with biblical applications to business practices. But the biblical narratives contain numerous references to human decisions that were made in the context of bargains, accords, rivalry, deceit, trust, speculation, goodwill and, uniquely, the predictable (and sometimes not so much) intervention of a benevolent yet unrelenting supreme being we call God. Strategy is about making decisions under uncertain and complex conditions, and game theory has been a widely adopted scientific method in the study of strategic decision making.* This book excerpt is chosen for this CBR issue with a focus on “Strategy” for two reasons. First, Brams’ application of game theory to analyzing familiar Old Testament stories is thought provoking in the sense that it shows the decisions made in these “stories” were rational (and indeed optimal) and have meanings consistent with the unique biblical theme. Second, and more importantly, the analyses demonstrate that the outcome of strategic decisions can be greatly impacted by the values and beliefs of the decision maker and, of course, the unfathomable actions of the Divine. For a business leader, for example, the “rational” outcome of a game theoretic approach to a particular strategy can be very different if he/she projects from a secular vs a biblical worldview. This would give us pause when we make complex, strategic decisions as Christians because to make the “right” decision we have to adopt the proper “God-centric” perspective. The study also makes the case for a rational, rather than emotional or random, approach to strategic decisions. The art of strategy, after all, is amenable to the analysis of scientific methods such as game theory, which should be more widely consulted in business practices. We are grateful to the publisher and the author for the permission to reprint this material. ©2002 Massachusetts Institute of Technology. All rights reserved.

*A good introduction to the subject would be *The Art of Strategy* by Avinash Dixit & Barry Nalebuff (W.W. Norton, 2008)

► INTRODUCTION

I shall explore through three stories some strategic aspects of just and wise decisions in the Bible. Interestingly enough, two of the stories involve prostitutes, who one might think would be least able to illuminate questions of justice and wisdom. Yet it is often just such characters who are most clear-headed about the benefits and costs of their choices as they try to cope with a world that is not always willing to honor their services.

Prostitution, though, is not the central issue in these stories. It is, rather, the rationality of subscribing to agreements with other parties or placing a decision in the hands of an arbitrator trying to coax out the truth. Indeed, it is the lack of honesty on the part of some characters in all three stories discussed that makes problematic the rendering of just and wise decisions.

Strategic calculations when truthfulness is suspect are not only hard to make but also pose certain ethical dilemmas. For example, when it is evident that one character is not telling the truth, is it ethical to try to use deception as a weapon to ferret it out? If a party has been deceived, does he or she have a right to abrogate an agreement made as a result of being deceived?

The stories analyzed in this chapter raise these kinds of questions and demonstrate the close linkage between ethics and strategy. Two of the stories occur after the death of Moses, whom Joshua replaced as leader of the Israelites. The third takes place during the reign of Solomon, who ruled as king of Israel several generations later. In all three stories, I believe the strategic analysis clarifies ethical questions raised by the actions of the protagonists. I shall touch upon the philosophical implications of these questions in the final section of this chapter.

► RAHAB AND THE SPIES

After the death of Moses, Joshua prepared for the occupation of Canaan by sending out two spies to reconnoiter the country: *They came to the house of a harlot named Rahab and lodged there. The king of Jericho was told, "Some men have come here tonight, Israelites, to spy out the country." The king of Jericho thereupon sent orders to Rahab: "Produce the men who came to you and entered your house, for they have come to spy out the whole country."* (Josh. 2:1-3)

Rahab admitted to seeing the two men but said they had already left. She claimed not to know where they had gone but urged that they be pursued.

The pursuit was fruitless, because Rahab had in fact hidden the men on her roof among stalks of flax. The reason she gave to the spies for deceiving her king was based on exactly the kind of information that God intended to convey by His punitive actions:

I know that the LORD has given the country to you, because

dread of you has fallen upon us, and all the inhabitants of the land are quaking before you. For we have heard how the LORD dried up the waters of the Sea of Reeds [Red Sea] for you when you left Egypt, and what you did to Sihon and Og, the two Amorite kings across the Jordan, whom you doomed. When we heard about it, we lost heart, and no man had any more spirit left because of you; for the LORD your God is the only God in heaven above and on earth below. (Josh. 2:9-11)

As a prostitute (and business woman), Rahab was certainly knowledgeable about the exchange of favors. Not intending to let her hiding of the spies go unrewarded, she put the following proposition to them:

Now, since I have shown loyalty to you, swear to me by the LORD that you in turn will show loyalty to my family. Provide me with a reliable sign that you will spare the lives of my father and mother, my brothers and sisters, and all who belong to them, and save us from death. (Josh. 2:12-13)

Recognizing a good deal when they saw one, the spies willingly accepted the proposition, but with the proviso that Rahab continue to support them.

Our persons are pledged for yours, even to death! If you will not disclose this mission of ours, we will show you true loyalty when the LORD gives us the land. (Josh. 2:14)

Abetting the escape of the spies from her roof, Rahab offered them some advice:

Make for the hills, so that the pursuers may not come upon you. Stay there in hiding three days, until the pursuers return; then go your way. (Josh. 2:16)

The spies, in turn, after reminding Rahab that their deal was binding only if she did exactly what they said, told her:

When we invade the country, you tie this length of crimson cord to the window through which you let us down. Bring your father, your mother, your brothers, and all your family together in your house. (Jos. 2:18)

Rahab followed their instructions to the letter, as the spies followed Rahab's advice. After hiding for three days in the hills, the spies escaped detection and returned safely to Joshua, reporting to him what happened.

With not inconsequential assistance from God, Jericho was captured after the sound of ram's horns and the shouts of the Israelite army brought its walls crashing down. Before the city was destroyed by fire, the two spies led Rahab and her family to safety, "for she had hidden the messengers that Joshua sent to spy out Jericho." (Josh. 6:25)

As given by the outcome matrix in Figure 6.1, there seems nothing very complex about the game played between Rahab and the spies. Rahab could either hide or not hide the spies; they could either save or not save Rahab after Jericho was taken (assuming that it was). Since Rahab had to make the first choice, it would appear that the proper representation of this game is as a 2 x 4 payoff matrix, in which the spies have four strategies, conditional on Rahab's two choices.

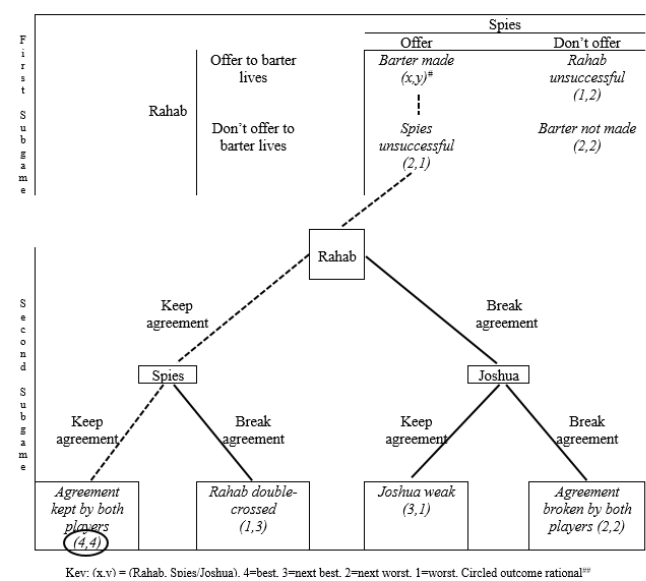
FIGURE 6.1
OUTCOME MATRIX OF RAHAB'S GAME

		SPIES	
		Save Rahab	Don't Save Rahab
RAHAB	Hide spies	Barter made; everybody lives	Rahab killed; spies live
	Don't hide spies	Spies killed; Rahab lives	Barter not made; Everybody killed

The problem with this representation is that it ignores some crucial steps in the sequence of moves, including the deal struck between Rahab and the spies and the fact that Rahab could still betray the spies after agreeing not to, and similarly, they could betray her after she saved them. Also, if Rahab did not hide the spies, they would never have had the opportunity to make a choice of saving her or not, as assumed in Figure 6.1 and in the 2 x 4 expansion of this outcome matrix. (In the 2 x 4 expansion, for example, the tat-for-tit strategy would say that after Rahab refuses to hide the spies, they would save her, which would be clearly impossible if they were dead!)

A more realistic representation of Rahab's game is as two nested subgames, shown in the revised representation in Figure 6.2. In the first subgame, Rahab and the spies must decide whether to offer to barter their lives or not. (Since it is essentially a choice they make simultaneously, it can be represented as a 2 x 2 game.) If neither offers, I assume both players obtain their next-worst outcome (2). If one offers and the other does not, I assume that the one who does not still obtains his next-worst outcome (2) because no barter is consummated; the one who offers, however – only to have his hopes dashed by the other player – receives his worst outcome (1).

FIGURE 6.2
RAHAB'S GAME REVISED



If both players agree to the barter, the second subgame ensues, with payoff (x,y) [see Editor's note at the end of article for explanation of symbols and outcome types used in this study] as yet to be determined. Now Rahab has the first move: she may either keep the agreement or break it. If she keeps the agreement and the spies escape with their lives, they in turn can either save her or kill her by keeping or not keeping their side of the agreement.

If they keep their word, I assume both they and Rahab obtain their best outcome (4); if they betray Rahab, they live but are dishonored for allowing someone to be killed who was loyal to them and had recognized their God as the only true God, which I take to be their next-best outcome (3). Rahab, who is double-crossed, receives her worst outcome (1).

Should Rahab not keep her agreement, the spies would be killed, and the choice would presumably fall on Joshua of whether or not to save Rahab (assuming he learned later of their betrayal). If he did not avenge the betrayal of his spies, I assume he would obtain his worst outcome (1), for he would be considered weak for not exacting retribution; Rahab would receive her next-best outcome (3) for living but suffering the guilt of her betrayal of the spies and possibly later retribution. (The later retribution might come if Joshua learned of her betrayal, because, like everybody else, Rahab and her family would presumably be killed when Jericho was destroyed.) Both players, I assume, would obtain their next-worst outcome (2) if they both broke the agreement, for it would be tantamount to not offering to barter in the first place.

Since the outcome chosen in the second subgame determines the rationality of bartering in the first subgame, prudence dictates that each player first determine the rational outcome in the second subgame. Plugging this outcome into the matrix of the first subgame in Figure 6.2, the players could then better ascertain a rational strategy choice in this subgame.

Starting with the bottom choices in the game tree of the second subgame in Figure 6.2, the spies would prefer (4,4) to (1,3), and Joshua would prefer (2,2) to (3,1). Working up the tree, between (4,4) and (2,2) Rahab would prefer (4,4), so the rational choice of each player in the second subgame is to honor the agreement he (she) makes. The question now is: Should they make this agreement in the first place?

Given that the outcome of the second subgame will be (4,4), this outcome can be substituted for (x,y) in the matrix defining the first subgame in Figure 6.2. However, while this substitution yields both players their best outcome (4) when they agree to barter their lives, it is not associated with a dominant strategy of either player, which neither has in this subgame after the substitution of (4,4) for (x,y). Thus, for example, while "offer" is better than "don't offer" for Rahab if the spies choose "offer," this is not true if the spies choose "don't offer," for "2" is better than "1" for Rahab in the spies' second column of Figure 6.2.

Define a superior outcome to be one preferred by both players to any other outcome in a two-person game. In a game having such an outcome but in which neither player has a dominant strategy, I interpret this to be the rational outcome of the game.

It is, however, rational in a weaker sense than an outcome associated with the dominant strategy of a player. To illustrate this point by the game in Figure 6.2, if one player should act irrationally

and either not return the other's offer or not keep his side of the agreement, the other player obtains his worst outcome (1). [If the other player had a dominant strategy in the first subgame, he could obtain at least his next-worst outcome (2).] Cognizant of this problem, I would nonetheless contend that in the composite game comprising the two subgames, it is rational for both players to barter their lives – and to do so in good faith, sticking to the agreement they make.

A notion of what constitutes a “just agreement” can be gleaned from Rahab's game. First, it must be voluntarily subscribed to, and second, it must be stable – invulnerable to violation by one or both players. By *invulnerable* I mean that neither player has an interest in violating an agreement once it is made, because he would suffer a worse outcome if he violated it, either by himself or together with the other player.

In Rahab's game, these conditions for a just agreement are clearly met: it was voluntarily subscribed to, and it was stable because, as the game-tree analysis demonstrated, either player would have done worse if he had violated the agreement. In fact, both players would have done worse, because the outcome (4,4), if lost in the second subgame, because one or both players violated the agreement, also would have been lost in the prior first subgame, assuming both players had agreed in the first subgame to barter their lives.

It is easy to see that if the players in a composite game are rational, their assent to an agreement in the first subgame implies that the agreement is stable in subsequent subgames. For if it were not, at least one player would have an incentive to violate it, assuming a violation by one player hurts at least one other player, that other player would not give his assent to the agreement in the first place. Hence, it is sufficient to define a just agreement as one to which rational players would subscribe. If they did not, it would be because they anticipate a violation that would hurt them, thereby robbing them of any incentive even to begin negotiation.

Recall that, to secure Rahab's agreement, the spies had told Rahab their barter of lives was conditional on her adhering to their instructions. Indeed, after telling Rahab and her family to stay indoors during the capture of Jericho, the spies repeated their conditions which Rahab accepted:

“If you disclose this mission of ours, we shall likewise be released from the oath which you made us take.” She replied, “Let it be as you say.” (Josh. 2:20-21)

Thus, the agreement in Rahab's game was rendered stable not just by a promise of the spies to keep it but by their avowal of revenge if they were betrayed. By inextricably linking their lives and Rahab's, the spies made it impossible for her to double-cross them with impunity, even though she could have struck the first blow by turning them in.

I shall next consider a case of an agreement that involved deception by one party to the agreement. Without deception, no agreement would have been made, so the agreement was by definition unjust. But in the end, the aggrieved party was able to implement the agreement in such a way that some of the sting was taken out of its deception.

▶ JOSHUA'S DECEPTION BY THE GIBEONITES

After the destruction of Jericho, Joshua next destroyed Ai, which struck fear in the inhabitants of Gibeon, a nearby people almost certain to face annihilation by the invading Israelites. To try to secure peace treaty with the Israelites, the savvy Gibeonites adopted the ploy of pretending to be inhabitants of a distant country who had traveled a long way. The Israelites were suspicious of their disheveled appearance, though, especially since they were permitted to make peace only with those who lived at a great distance from them.

But perhaps you live among us; how then can we make a pact with you? (Josh. 9:7)

First, countering with a concession – a willingness to be subjugated – the Gibeonites repeated their lie:

They said to Joshua, “We will be your subjects.” But Joshua asked them, “Who are you and where do you come from?” They replied, “Your servants have come from a very distant country, because of the fame of the LORD your God.” (Josh. 9:8-9)

The Gibeonites then added, revealingly, that it was not fame alone that impelled them but that they had heard “of all that He [God] did in Egypt.” (Josh. 9:9)

The Gibeonites claimed to have proof of the great distance they traveled:

This bread of ours, which we took from our house as provision, was still hot when we set out to come to you; and see how dry and crumbly it has become. These wineskins were new when we filled them, and see how they have cracked. These clothes and sandals of ours are worn out from the very long journey (Josh. 9:12-13).

In the end, Joshua was taken in:

Joshua established friendship with them; he made a pact with them to spare their lives, and the [Israelite] chieftains of the community gave them their oath. (Josh. 9:15)

But three days after the treaty was granted, the Israelites learned the truth. Though outraged, they

Did not attack them, since the chieftains of the community had sworn to them by the LORD, the God of Israel. (Josh. 9:18)

It was a moral precept at the time that an oath, even made in error, could not be broken.

To placate their people, the Israelite chieftains told them that the Gibeonites would become “hewers of wood and drawers of water for the whole community” (Josh. 9:21). A perplexed Joshua then summoned the Gibeonites and asked them:

Why did you deceive us and tell us you lived very far from us, when in fact you live among us? Therefore, be accursed! Never shall your descendants cease to be slaves, hewers of wood and drawers of water for the House of my God. (Josh. 9:22-23)

In what must stand as one of the most brutally candid admissions in the Bible, the Gibeonites replied to Joshua:

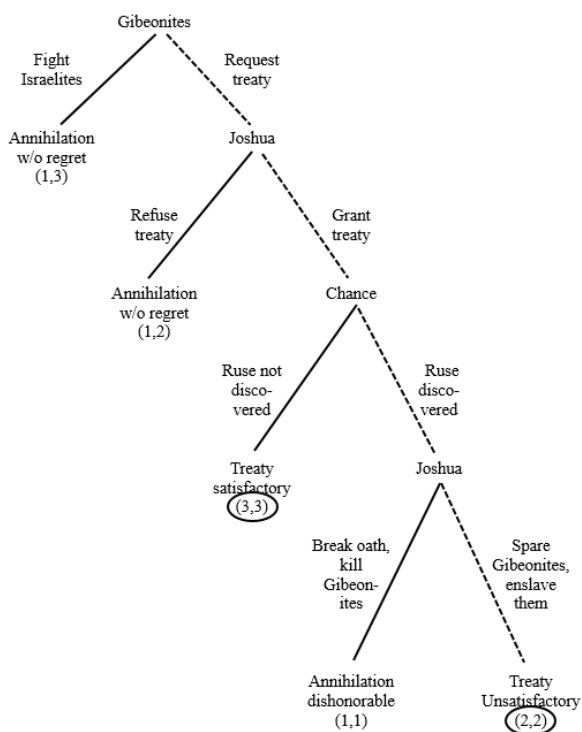
You see, your servants had heard that the LORD your God had promised His servant Moses to give you the whole land and to wipe out all the inhabitants of the country on your account; so we were in great fear for our lives on your account. That's why

we did this thing. And now we are at your mercy; do with us what you consider right and proper. (Josh. 9:24-25)

The words “right and proper” convey the hope of the Gibeonites that a just solution could be found. Indeed, making the Gibeonites slaves seems to have been more or less agreeable to both them and the Israelites, but it is not a “just agreement” in the sense used in [Rahab’s case]. To show why this is so, it is first necessary to model the game played between the Gibeonites and Joshua and the Israelites (whom henceforth I shall lump with Joshua and refer to as simply the single player “Joshua”).

As depicted in the game tree of Figure 6.3, the Gibeonites must initially choose between fighting the Israelites or seeking a peace treaty through misrepresentation of their situation. Assuming they seek a treaty, Joshua may either grant or refuse their request.

FIGURE 6.3
GAME TREE OF JOSHUA’S DECEPTION BY THE GIBEONITES



Key
(x,y) = (Gibeonites, Joshua)
3 = best; 2 = medium; 1 = worst
Circled outcomes rational (depending on Chance's choice)

If Joshua grants the Gibeonites their request, a new “player,” not modeled before, enters the picture. This player, which I call Chance, is not of course a real player capable of making rational choices with respect to a set of preferences. Rather, Chance determines whether or not the ruse of the Gibeonites is discovered, which I assume to be an event that has a nonzero probability of occurrence.

Chance becomes “known” to Joshua only when the ruse of the Gibeonites is discovered. When this occurs, Joshua has the choice of breaking the oath he made to the Gibeonites or sticking to his word. If he chooses the latter course of action, he can enslave the Gibeonites but not kill them.

For both the Gibeonites and Joshua, I postulate a three-tier ranking of outcomes: best (3), medium (2), and worst (1). Starting with the Gibeonites, I assume their worst outcome (1) occurs when any one of the following three possibilities arises: they fight the Israelites; Joshua refuses them the treaty; or they are killed by the Israelites after their ruse is discovered. Since the Gibeonites would be annihilated in all three cases, I rate them as equally bad. Better for them would be to be spared after their ruse is discovered (2), and best would be not to have their ruse discovered at all (3) – if, indeed, this were possible.¹

By comparison, Joshua would least like to break his sacred oath and kill the Gibeonites after their ruse is discovered (1). He would prefer to spare the Gibeonites or to have refused them a treaty in the first place (2).

I ranked the latter outcome for Joshua not as high as fighting the Gibeonites at the outset (3), because – in the absence of a request for a treaty – he could not be accused of turning down a reasonable proposal from a distant and non-threatening people. Somewhat paradoxically, perhaps, I would argue that Joshua would also enjoy his best outcome (3) if the ruse were not discovered, because at least he could not be the wiser for having been deceived. (I implicitly assume that Joshua would prefer not to have his reputation sullied by having been duped.) Unfortunately for Joshua, Chance permitted him only three days before he learned of the hoax that had been perpetuated on him.

In fact, the Bible hints, if Joshua had been a little more respectful of God, he would not have suffered this hoax:

The men took [the Gibeonites’ word] because of their provisions, and did not inquire of the Lord. (Josh. 9:14)

Thus, one might plausibly interpret Chance to be God, who, when ignored by Joshua and his men, lets the pact be consummated before unmasking the true origins of the Gibeonites. God, in other words, might be regarded as a player hiding behind Chance; unlike Chance, which has no preferences, God wants Joshua and the Israelites to pay a price for not consulting Him on the matter of the Gibeonites. After paying this price, Joshua appeared to show more respect by making the Gibeonites slaves “for the community and for the altar of the LORD, in the place that He would choose” (Josh. 9:27).

Whether or not Chance is controlled by God, after the discovery of the hoax the only rational course of action for Joshua was to spare the Gibeonites. I presume that he could take some solace from knowing that they would be slaves to the Israelites. Nevertheless, I rate the payoffs associated with this outcome [(2,2)] unequivocally worse for both players than the payoffs associated with a successful cover-up of the hoax [(3,3)].

Because of the intervention of Chance (or God), the rational outcome, at least for the human players, of (3,3) was not selected in this deception game. It is worth noting that if the game had terminated just prior to Chance’s move, and his move were replaced by the (3,3) outcome (“ruse not discovered”), it could then be said that Joshua and the Israelites acted rationally by granting the treaty. This is the truncated game Joshua probably perceived.

But Chance did intervene to upset the calculations of Joshua. In so doing, it rendered the agreement he had made with the Gibeonites unjust, for the (2,2) outcome that occurred is unstable

vis-à-vis the possibility of the (3,3) outcome.

Because the Gibeonites knew that their ruse might be discovered, they were not despondent about attaining a “2” outcome and thereby avoiding annihilation. Joshua, on the other hand, had more reason to regret Chance’s choice, but it is probably unfair to blame just Chance in the selection of the (2,2) outcome. After all, it was the Gibeonites’ deception that gave Chance its move, so they also must share the blame for an unjust agreement. Even Joshua does not seem totally blameless, for he did not take the necessary precautions to check up on the authenticity of the Gibeonites’ claims. Like Issac, who refused to believe that “Esau” (Jacob) was an impersonator, Joshua’s gullibility – and perhaps disregard of God – came back to haunt him.

Whoever deserves the blame for Joshua’s deception, a treaty was agreed to that I presume would not have been if all parties had been fully aware of moves in the game tree. Since the game that was played was one of incomplete information – at least for Joshua – it is only after the fact that his acquiescence to the Gibeonites’ request renders the agreement unjust.

Had Joshua acted on his suspicions, or after consulting God, the “unjustness” of the agreement would have been evident, and he could have turned down the request of the Gibeonites for good reasons. Effectively, his “good reasons” would have transformed the (1,2) payoff for refusing their request into a (1,3) payoff; rationality considerations would then dictate that he refuse the Gibeonite request, for he would thereby obtain his best outcome (3).

This is not, of course, how Joshua saw things. Since his suspicions were not sufficiently aroused, he permitted the elusive player I have called Chance (perhaps an impersonation of God) a move. Although Joshua and the chieftains were hurt by its move – the Bible says that the Israelites “muttered against the chieftains” (Josh. 9:18) after the Gibeonite deception was discovered – both players seemed content to live with the treaty afterward. The Gibeonites walked away with their lives, and Joshua and the Israelites had slaves to serve them; so the treaty was not such a bad bargain after all.

▶ SOLOMON’S WISDOM

Most of the “wisdom” of the Bible is simply asserted, as in Proverbs, which is filled with advice about proper behavior, admonitions against improper behavior, and miscellaneous sayings and aphorisms meant to be instructive on various matters. Lessons, of course, are meant to be learned from the stories of conflict and intrigue I have already discussed, but the message in these stories is usually less direct and more often subject to different interpretations.

It is a rare story, indeed, that imbues a character other than God – or one with God at his side – with a soaring intelligence and depth of insight that seem to surpass human bounds. True, most characters act rationally according to their preferences, and a few like Cain, and Moses in his later years, show by the arguments they present to God that they are brilliant strategists. It is hard, however, to find human characters who, when pitted against fellow mortals, emerge as larger-than-life figures by virtue of their godlike wisdom.

The biblical character in the Old Testament who stands out as the striking exception to this statement is Solomon, who ruled as king of Israel after David. What is usually considered his most breathtaking judgment is described in just twelve verses in chapter 3 of the First Book of Kings.

This judgment concerns the disposition of a baby for whom two women claimed maternity. I shall model this judgment as a game Solomon devised to test the veracity of the two women’s claims. Although the game as played involved one woman’s moving first, Solomon could have set the rules differently – to allow for simultaneous moves – and still have achieved the same result. Also, I shall show how the concept of “wise arbitration” – to complement the notion of a “just agreement” defined earlier – can be derived from Solomon’s game. Unlike a just agreement, which depends only on the choices that the parties to an agreement make, wise arbitration depends also on the choices of a nonplayer, who arbitrates a settlement between the parties to a dispute.

Solomon’s game arises from a dispute between two prostitutes who come before him:

The first woman said, “Please, my Lord! This woman and I live in the same house; and I gave birth to a child while she was in the house. On the third day after I was delivered, this woman also gave birth to a child. We were alone; there was no one else with us in the house, just the two of us in the house. During the night this woman’s child died, because she lay on it. She arose in the night and took my son from my side while your maidservant was asleep, and laid him in her bosom; and she laid her dead son in my bosom. When I arose in the morning to nurse my son, there he was, dead; but when I looked at him closely in the morning, it was not the son I had borne.” (1 Kgs. 3:17-21)

The other prostitute protested this version of their encounter: *No; the live one is my son, and the dead one is yours! (1 Kgs. 3:22)*

The two women continued arguing in Solomon’s presence, while he reflected:

“One says, ‘This is my child, the live one, and the dead one is yours; and the other says, ‘No, the dead boy is yours, mine is the live one.’” So the king gave the order, “Fetch me a sword.” (1 Kgs. 3:23-24)

Solomon’s solution was one of dazzling simplicity:

Cut the live child in two, and give half to one and half to the other. (1 Kgs. 3:25)

The subtlety underlying this solution soon became apparent in the reactions of the two claimants:

But the woman whose son was the live one pleaded with the king, for she was overcome with compassion for her son. “Please, my lord,” she cried, “give her the live child; only don’t kill it!” The other insisted, “It shall be neither yours nor mine; cut it in two!” (1 Kgs. 3:26)

Then Solomon pronounced judgment:

“Give the live child to her [the first woman],” he said, “and do not put it to death; she is its mother.” (1 Kgs. 3:27)

The story concludes with the following observation:

When all Israel heard the decision that the king had rendered, they stood in awe of the king; for they saw that he possessed divine wisdom to execute justice. (1 Kgs. 3:28)

Thus is Solomon venerated for his exemplary judgment. The outcome matrix for the game played between the two women, reacting to Solomon's order to cut the baby in two, is shown in Figure 6.4. I assume the mother's goal is to save her baby, the impostor's to win Solomon's favor; by acceding to Solomon's judgment, the impostor indicated absolutely no interest in the baby's welfare, much less having him for herself.

More specifically, the mother, I believe, would consider the best outcome (4) to be that in which both women protest Solomon's order. Because their combined protest would be most likely to save the baby. If the mother protested alone, the baby perhaps might be saved, so this would be the mother's next best outcome (3).

This latter strategy would lead to the impostor's best outcome (4); she would win Solomon's favor, because the mother's single protest would unequivocally distinguish her (the impostor's) support of the king's order and the mother's non-support. The outcome the impostor would next most prefer (3) is that in which neither she nor the mother protested the king's order, because then, although she would not be singled out favorably, she would not be in his disfavor. For the mother, though, this strategy would lead to her worst outcome (1), for the baby would surely die.

I assume that a better outcome (2) for the mother is for her not to protest and the impostor to protest; the baby might be saved, but he would not go to her. In fact, I believe, the mother would be abject for rejecting her baby when the impostor did not, though the possibility that the baby might survive under these circumstances prevents this outcome from being her worst. For the impostor, on the other hand, this would be an odious outcome (1), because she would lose the favor of the king by protesting his order while the mother did not. As I previously indicated, the impostor would most prefer that the opposite happen.

The actual game played was one in which the mother, by protesting the king's order, committed herself first; then the impostor responded. The payoff matrix for this 2 x 4 game is given in Figure 6.5 and shows both women to have dominant strategies: the mother protests (P), and the impostor doesn't protest regardless (P/P), which leads to outcome (3,4), the next-best outcome for the mother and the best for the impostor.

In pursuit of the truth, fortunately, Solomon had foreseen the

women's true preferences. He correctly gauged that the women would play the game as I have modeled it: the mother's highest priority would be saving her baby, even at the cost of losing him to the impostor. Thus, Solomon was playing a kind of game with the women in which he read the strategies they chose in the game he devised as evidence of who was telling the truth, which is in the end what he was interested in uncovering.

Wise arbitration involves the setup of a game by an arbitrator in such a way as to distinguish truthful from untruthful disputants. That is, the arbitrator designs the rules of the game such that play of the game reveals which player is the deceiver (assuming one disputant's claim is truthful and the other's is not). Such arbitration is "wise" in the sense that it distinguishes honest players from dishonest players by eliciting responses that, when properly interpreted,

indicate who is lying and who is truthful. It is difficult to define "properly interpreted," but one necessary condition is that the players not know the arbitrator's interpretation of their strategy choices. If they did, then presumably the players would play a different game from that which the arbitrator intends, and he thereby would not elicit the truth-revealing responses he wants.

For example, assume that the impostor knew that Solomon did not desire her affirmation of his order but instead intended to favor the woman (women) who protested his order. Then it would obviously be in her interest also to protest, and the game would not distinguish her from the mother.

The arbitrator does, of course, want the disputants to play a game, but the structure of their preferences should not be such that one player has to anticipate the other's choice in order to make a rational choice himself. This point can be illustrated in Solomon's game by noting that because each woman had a dominant strategy in figure 6.5, it was unnecessary for either to try to predict the other's choice. Whatever the other's choice, each woman's dominant strategy was best against it.

It is easy to show that a slight alteration in the rules of the game would still have elicited truth-revealing responses from the two women. If the women had been in separate rooms when Solomon informed each of his order, they would have played the game shown in

figure 6.4, for neither woman would have been responding to the

FIGURE 6.4
OUTCOME MATRIX OF SOLOMON'S GAME

		Impostor	
		Protest order (P)	Don't protest order (P̄)
Mother	Protest order (P)	Baby surely saved (4,2)	Baby perhaps saved; impostor wins favor of Solomon (3,4)
	Don't protest order (P̄)	Baby perhaps saved; impostor loses favor of Solomon (2,1)	Baby surely killed (1,3)

Key
(x,y) = (Mother, Impostor)
4 = best; 3 = next best; 2 = next worst; 1 = worst

FIGURE 6.5
PAYOFF MATRIX OF SOLOMON'S GAME

		Impostor			
		P/P	P̄/P̄	P/P̄	P̄/P̄
Mother	P	(4,2)	(3,4)	(4,2)	(3,4)
	P̄	(2,1)	(1,3)	(1,3)	(2,1)

Key
(x,y) = (Mother, Impostor)
4 = best; 3 = next best; 2 = next worst; 1 = worst
Circled outcome rational

← Protest dominant
Don't protest regardless dominant

strategy choice of the other. That is, because each's strategy choice would have been made in ignorance of the other woman's choice, the game can be modeled as a 2x2 game.

In the 2x2 game shown in Figure 6.4, both women have dominant strategies – the impostor to agree with the king, the mother to protest. Thus, this game, as well as the 2x4 game actually played – in which the mother reacted to the king's order first and the impostor knew her response – would also have ferreted out the truth.

To carry this kind of analysis one step further, consider a hypothetical game in which the impostor's preferences are the same as the mother's: both most prefer a double protest [(4,4)] and least prefer no protest [(1,1)]; each would next most prefer to protest (3) when the other does not (2). Notice in this new game that the impostor no longer has a dominant strategy of agreeing with the king; instead she has, like the mother, a dominant strategy of protesting, thus assuring the mutually best outcome (4,4).

This game, however, is not one involving deception but rather one in which information about maternity is fugitive. Naturally, if both women have maternalistic preferences, and each protests the order, it would not make things easy for a Solomon. But well it should not, for if each woman truly believes she is the mother, and the maternity of the baby cannot be determined from any external evidence, wise arbitration alone will not be sufficient to settle the dispute. No game to ferret out the truth can be constructed, even by a Solomon, if the truth is not there to be ferreted out.

► CONCLUSIONS

It is probably no accident that the stories that seem to shed the most light on justice and wisdom in the Old Testament involve deception: Rahab deceives her king by sheltering the Israelite spies and facilitating their escape; the Gibeonites deceive Joshua into believing that they have journeyed from a distant land; and one of the prostitutes attempts to deceive Solomon that a baby is hers.

It is the element of deception in each of these stories that forces the characters to make difficult strategic choices and ethical decisions.

1. Should the spies sheltered by Rahab trust a prostitute who was willing to lie to her king? They do, but they make Rahab, who must show her good faith first, painfully aware that her fate is tied to theirs. This mutual understanding renders her betrayal irrational and thereby makes the agreement they reach just.

2. Should Joshua believe the Gibeonites' tale and accept at face value the evidence they show him of their long journey? He does so despite his suspicions, granting them a peace treaty, only to learn three days later of his foolishness. The treaty is unjust precisely because Chance (or God) rendered it unstable with respect to the alternative Joshua did not consider – when he put aside his suspicions and failed to consult God.
3. Should Solomon carry out his order to cut the disputed baby in two? His wisdom and perspicacity shine through when he evaluates the responses of the prostitutes to his order, based on the game he surmised they would play, and retracts it, awarding the baby to the protesting mother. The lesson seems to be that an arbitrator is wise if he deceives those whose dispute he is arbitrating in such a way as to reveal which disputant is being truthful.

These decisions raise an interesting ethical question: Can deception be put to the service of justice and wisdom? A just agreement was consummated between Rahab and the Israelite spies because she deceived her king, and Solomon's decision is applauded because he hoodwinked the impostor into thinking that he was looking for affirmation of his order. Even the Gibeonites can be admired for their strategic acumen, though they foisted upon an innocent and insufficiently God-fearing Joshua an unjust agreement.

These stories raise difficult philosophical issues concerning the morality of deception, particularly when it is ostensibly linked to just agreements or wise arbitration. As I noted, Solomon's probity has been universally extolled, but one can well imagine ingenious arbitration games that elicit only half-truths, or do not place the elicited information in a proper context.²

Rules of law are supposed to prevent this, but they are of course not perfect. Unscrupulous individuals, without the judicious temperament of a Solomon, may succeed in sabotaging agreements or subverting institutions. Biblical stories teach us that such problems are ameliorated by having a good knowledge of, and healthy respect for, the strategic weaknesses in situations.

Morality is empty without safeguards to enforce it, as Joshua learned to his dismay. These safeguards may be either explicit, as were those agreed to by Rahab and the spies, or implicit in the nature of the game played, as those in the game played between the prostitutes who were not sophisticated enough to see through Solomon's motives. I judge arbitration schemes like Solomon's dangerous, however, because their assumption of a naïveté on the part of the players may sometimes be unwarranted.



► NOTES

[#]Editor's note: A rank-order scale is used in this study for outcomes of player decisions. In a 2-player game, the preference of each player is indicated in the order intended. For example, the ranked preferences of players X and Y will be notated as (x,y) where x, y can take on a numerical score denoting their respective rank preference. Thus (4,3) is preferred to (3,4) for X but inferior for Y. Some games are sequential in nature, namely, a subsequent decision ensues from the prior choice of a player. These are called contingent choices. Thus if rival retailers (x,y) both consider reducing prices (R) in reaction to the other's first move, we could have $R/R = X$ reduces price regardless of Y decision; $\bar{R}/\bar{R} = X$ not reduces price regardless of Y decision; $R/\bar{R} = X$ reduces price if Y does and not reduces price if Y does not (Tit-for-Tat); and $\bar{R}/R = X$ not reduces price if Y reduces price and reduces price if Y does not (Tat-for-tit).

^{##}Editor's note: In game theory, a rational outcome is the best

outcome (utility) attainable by a player given the choices of the other players. A dominant outcome is the best outcome achievable by a player regardless of how the other players act. An optimal outcome is one in which no player can improve their payoff by unilaterally changing their actions, thus delivering a stable solution, as in a Nash Equilibrium.

^[1]Since Joshua, the Gibeonites believed, had through Moses been promised "the whole land," and all inhabitants had been slated to be "wipe(d) out" (Josh. 9:24), it must have seemed very likely to them that they would be unmasked at some point. Then, and only then, would having a treaty save them.

²Sissela Bok, *Lying: Moral choice in Public and Private Life* (New York: Pantheon Books, 1978), offers a good analysis of such questions. See also Steven J. Brams, "Deception in 2x2 Games," *Journal of Peace Science*, 2 (Spring 1977): 171-203; and Steven J. Brams and Frank C. Zagare, "Deception in Simple Voting Games," *Social Science Research*, 6 (September 1977): 257-272.