1. **Principles of decision making**
   a. Consumer preferences tell us about people's likes and dislikes.
   b. Consumer theory assumes that consumers' preferences are coherent, in the sense that they respect the Ranking Principle. It also assumes that their decisions reflect preferences, in the sense that they respect the Choice Principle.

2. **Consumer preferences**
   a. Since many consumer decisions are interdependent, decision makers need to compare consumption bundles.
   b. For the typical decision, it's reasonable to assume that consumers prefer more to less. In summarizing the properties of indifference curves below, we make this assumption.
   c. Indifference curves for goods are thin and never slope upward.
   d. The indifference curve that runs through any consumption bundle, call it $X$, is the boundary that separates all the better-than-$X$ alternatives from all other options. The better-than-$X$ alternatives lie to the northeast of the indifference curve. The worse-than-$X$ alternatives lie to the southwest.
   e. Indifference curves from the same family never cross.
   f. In comparing any two alternatives, the consumer prefers the one located on the indifference curve furthest from the origin.
   g. One way to describe consumers' preferences mathematically is to write formulas for their indifference curves.
   h. For every bad there is an associated good. We can apply consumer theory to bads by thinking about the associated goods.

3. **Substitution between goods**
   a. The marginal rate of substitution varies from one consumer to another according to the relative importance the consumer attaches to the goods in question.
   b. As we move along an indifference curve from the northwest to the southeast, the curve usually becomes flatter. Equivalently, the amount of one good, $Y$, require to compensate a consumer for a fixed change in anothe good, $X$—and hence the MRS for $X$ with $Y$—declines becomes more plentiful and $Y$ becomes more scarce. T feature is known as a declining MRS.
   c. A second way to describe consumers' preferences mathematically is to write formulas for their marginal rates of substitution.
   d. Whether or not two individuals can engage in mutu beneficial trade depends on their marginal rates of substitution.
   e. The indifference curves for perfect substitutes are straight lines.
   f. The indifference curves for perfect complements a L-shaped—vertical above a kink point, and horizontal below it.

4. **Utility**
   a. Economists use the concept of utility to summariz everything that is known about a consumer's preferen
   b. We can create a utility function from a family of indifference curves by assigning the same utility valu all bundles on an indifference curve, with higher valu assigned to indifference curves that correspond to hig levels of well-being. We can construct indifference cu from a utility function by setting the function equal to constant.
   c. In modern microeconomic theory, utility functions only intended to summarize ordinal information.
   d. By itself, the marginal utility of a good does not measure anything meaningful. However, the ratio of t marginal utilities for two goods is equal to the margin rate of substitution between them.

## ADDITIONAL EXERCISES

**Exercise 4.1:** After reading this chapter, a student complains, "What I like and dislike isn't always the same; it depends on my mood." Is this a problem with consumer preference theory? Why or why not?

**Exercise 4.2:** Suppose there are two types of food, meat and bread. Draw indifference curves for the following consumers.
a. Ed likes variety and prefers to eat meat and bread together.

b. Francis dislikes variety; she likes to eat the same thing the time.

c. Mia is a vegetarian who doesn't care (one way or the c about meat.

d. Taka, a sumo wrestler, cares only about the number of calories he consumes; he wants to consume as many calories as possible.

**e.** Larry loves to eat and enjoys variety, but he also wants to lose weight. He therefore thinks that food is a good at low quantities, and a bad at high quantities.

**Exercise 4.3:** Gary has two children, Kevin and Dora. Each one consumes "yummies" and nothing else. Gary loves both children equally. For example, he is equally happy when Kevin has two yummies and Dora has three, or when Kevin has three yummies and Dora has two. But he is happier when their consumption is more equal. Draw Gary's indifference curves. What would they look like if he loved one child more than the other?

**Exercise 4.4:** As in the previous question, suppose that Gary loves Kevin and Dora equally. What is his marginal rate of substitution between Kevin's yummies and Dora's yummies when each has the same number of yummies? Does it become larger or smaller when Kevin has more yummies than Dora? What about when Dora has more yummies than Kevin?

**Exercise 4.5:** For lunch, Ada prefers to eat soup and bread in fixed proportions. When she eats $X$ pints of soup, she prefers to eat $\sqrt{X}$ ounces of bread. If she has $X$ pints of soup and more than $\sqrt{X}$ ounces of bread, she eats all the soup along with $\sqrt{X}$ ounces of bread, and throws the extra bread away. If she has $X$ pints of soup and fewer than $\sqrt{X}$ ounces of bread (say $Y$ ounces), she eats all the bread along with $Y^2$ ounces of soup and throws the extra soup away. Draw Ada's indifference curves between soup and bread.

**Exercise 4.6:** Think of five examples of bads. In each case, what is the associated good? (For example, air pollution is a bad; clean air is the associated good.)

**Exercise 4.7:** Ryan hates both water pollution and air pollution. He thinks that the harm caused when water pollution increases by a fixed amount rises with the total amount of water pollution, and that the harm caused when air pollution increases by a fixed amount rises with the total amount of air pollution. Sketch Ryan's indifference curves for the amount of water pollution and the amount of air pollution. Indicate how he ranks the curves you've drawn.

**Exercise 4.8:** Suppose bundles A and B lie on the same indifference curve. Bundle C lies between bundles A and B, on a straight line that connects them. The consumer's preferences satisfy the Declining MRS Principle. Does the consumer prefer C to A and B, or does he prefer A and B to C?

**Exercise 4.9:** Nora likes to breed rabbits. Clearly, she can't get very far with one rabbit. Thinking about the trade-offs between rabbits and other goods, would you expect the Declining MRS Principle to hold? Can you think of other situations in which it might be violated?

**Exercise 4.10:** What do you think the indifference curves in Figure 4.5 would look like for the type of person who prefers to purchase a sports car? What about the type of person who prefers to purchase a subcompact?

**Exercise 4.11:** John's MRS for reading books with watching movies is three movies per book regardless of the amounts consumed. Would he rather read two books and watch no movies, or read no books and watch two movies? What is the formula for his family of indifference curves? What do these curves look like? In this example, are movies and books perfect substitutes, perfect complements, or neither?

**Exercise 4.12:** Do the following pairs of products serve as complements or substitutes? In each case, is the degree of complementarity or substitutability high or low? Do your answers depend on the contexts in which the goods are used? (1) Bread and butter. (2) Ball point pens and computers. (3) Facsimile service and mail service. (4) Movies and video games. (5) Gasoline and ethanol. (6) Wireless telephone service and standard (wireline) telephone service. (7) Different CDs recorded by the same rock group. (8) Lettuce and ground beef.

**Exercise 4.13:** Kate has 25 M&Ms and Antonio has 10 Milk Duds. Suppose Kate's MRS for Milk Duds with M&Ms is 4 regardless of what she consumes, and that Antonio's is 3 regardless of what he consumes. Kate and Antonio trade until there is no further opportunity for mutual gain. Can you say anything about what they've traded (how many M&Ms for how many Milk Duds)?

**Exercise 4.14:** Latanya likes to talk on the telephone. We can represent her preferences with the utility function $U(B, J) = 18B + 20J$, where $B$ and $J$ are minutes of conversation per month with Bill and Jackie, respectively. If Latanya plans to use the phone for one hour to talk with only one person, with whom would she rather speak? Why? What is the formula for her indifference curves? Plot a few of those curves.

**Exercise 4.15:** Do you think there is a workable way to obtain meaningful *cardinal* information about a consumer's preferences? If so, how might you go about it? If not, why not?

**Exercise 4.16:** In Exercise 4.14, we discussed Latanya's preferences for telephone conversation. According to our assumption, we can represent her preferences with the utility function $U(B, J) = 18B + 20J$, where $B$ and $J$ are minutes of conversation per month with Bill and Jackie, respectively. What is Latanya's implied marginal utility of speaking with Bill? What is her implied marginal utility of speaking with Jackie? What is her MRS for minutes talking to Bill with minutes talking to Jackie?

**Exercise 4.17:** Esteban likes both chocolate ice cream and lemon sorbet. His preferences correspond to the utility function $U(C, S) = C^{1/3}S^{2/3}$, where $C$ stands for ounces of chocolate ice cream and $S$ stands for ounces of lemon sorbet. Write a formula for Esteban's family of indifference curves. Plot some of those curves on a graph. Would Esteban rather have four ounces of chocolate ice cream and two ounces of lemon sorbet or two ounces of chocolate ice cream and four ounces of lemon sorbet?

# CONSTRAINTS, CHOICES, AND DEMAND

In recent years, the Honda Accord has consistently ranked among the best-selling cars in the United States. Yet if you ask a group of your friends to name their favorite automobiles, few would place the Accord near the top. It lacks the luxury of a Bentley, the engineering of a Mercedes, the sex appeal of a Ferrari, the sophistication of an Aston-Martin, the performance of a Porsche. The Accord is simply a plain-looking car that delivers a safe, comfortable ride with relatively few headaches. Above all, it's affordable: the price is reasonable and the maintenance cost is low. The Ferrari Enzo may turn heads, but its $643,330 price tag keeps most buyers out of the showroom.

Honda Accord (above) and Ferrari Enzo (below)

When the owner of a $23,000 Honda Accord says the Ferrari Enzo is not affordable, his meaning is obvious. Most people just don't have the necessary cash to buy an Enzo. But when he says he can't afford a $47,000 Mercedes E320, his meaning is probably more subtle. Many Accord owners *could* purchase more expensive cars. They *choose* the Accord because they don't think a flashy car is worth the necessary sacrifices, which could include working overtime, skipping vacations, or living in a smaller home.