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Richard A. Posner

Gertrud M. Fremling

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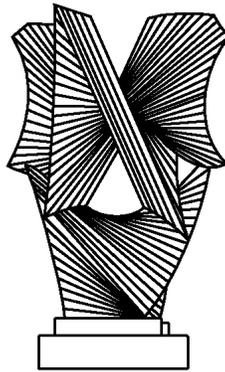
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Market Signaling of Personal Characteristics

Gertrud M. Fremling and Richard A. Posner

THE LAW SCHOOL
THE UNIVERSITY OF CHICAGO

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MARKET SIGNALING OF PERSONAL CHARACTERISTICS

*Gertrud M. Fremling and Richard A. Posner**

I. INTRODUCTION

It is well recognized in economics today that a great deal of behavior is motivated by a desire to signal the possession of valued (or, occasionally, feared) traits. The literature considers signaling behavior by business firms in market settings and by individuals in personal, nonmarket settings such as courtship and friendship but it does not consider signaling behavior by individuals in market settings and it is that gap that we hope in this paper to fill. It is a large gap. Labor and consumer markets are an important part of the economy, and signaling by workers and consumers is an important and neglected feature of these markets. Certain types of market behaviors by individuals—such as selling consumer goods or performing work at a “low” wage—are avoided because of the undesirable signals that such behavior conveys. Others are undertaken (in part anyway) to signal desirable traits, for example offering to work at a job that is compensated mainly by bonus or commission rather than straight salary; but we do not discuss these specific examples.

The idea for this paper arose out of our dissatisfaction with some of the claims of “behavioral economics” (see R. Posner (1998)¹) conjoined with our research on status signaling (Fremling

* Fremling has a Ph.D. in economics from the University of California at Los Angeles. Posner is chief judge of the U.S. Court of Appeals for the Seventh Circuit and a senior lecturer at the University of Chicago Law School. The authors thank Gary Becker, John Lott, Ignacio Palacio-Huerta, Eric Posner, Eric Rasmusen, Cass Sunstein, and Richard Thaler for their very helpful comments on a previous draft, and participants in the University of Chicago’s Workshop in Rational Models in the Social Sciences, where an earlier version of the paper was given on October 12, 1999, for their very helpful comments. The authors welcome further comments; their email addresses are GFremling@aol.com, and richard_posner@ca7.uscourts.gov, respectively.

¹ The qualification in “some” should be emphasized. There is no doubt of the utility of a number of the concepts of behavioral economics, and of cognitive psychology more generally. See, for example, R. Posner (1999).

and R. Posner (1999)). We argue in Part VII of the present paper that several of the major puzzles of rationality identified by behavioral economists (as in Thaler (1980), (1991), Rabin (1998), and Jolls, Sunstein, and Thaler (1998)) may be dispelled when situated within a framework that considers future opportunities for social or economic interaction and so the incentive for signaling behavior. An individual will often forgo small immediate economic gains to protect or enhance his future opportunities. The perfectly rational motive to portray oneself as an economically well-off, caring person can have a multitude of interesting consequences for market behavior. We also suggest a possible way of determining whether the behavioral model or a signaling model provides more accurate predictions.

Just as business firms have incentives to send the right signals to potential business partners, employees, customers, and competitors, as by emphasizing the signaler's high-quality work, reliability, trustworthiness, altruism—or for that matter his competitive ferocity, as in the literature on predatory pricing (see, e.g., Lott (1999))—so individuals have incentives to signal selected traits to the people with whom they have or seek to have interactions. Behavioralists, as well as other social scientists, and moral philosophers, place great weight on fairness, altruism in a nonutilitarian sense (that is, acting out of duty rather than because of interdependent utility functions), guilt as a motivator, and other values conceived to be noninstrumental. We, in contrast, treat signaling as a self-interested phenomenon. The characteristics signaled need not be, and often are not, self-interested ones; but the only incentive to signal them, that is, to communicate them to other people in a credible form (usually involving some cost), is to gain some advantage in transactions, broadly interpreted to embrace nonpecuniary social interactions as well as “economic” transactions in a narrow sense.² This is not to suggest that there is anything wrong with signaling, although it is important to note that rational signaling need only be credible and thus need not convey true information; there is room for deception. We take up these issues

² This is a bit overstated. For example, one might give nonanonymously to a charity not to get “credit” for being altruistic, but to encourage giving by others who might repose trust in one's judgment.

later. Our only point here is that we view signaling as motivated by a rational desire to improve the signaler's future interactions, whether social or business.

There are two important differences between our approach and that of the existing literature on signaling. The first is that the existing literature on signaling behavior by individuals is focused on noncommercial transacting, including the marriage and friendship "markets." Second, the signals that are studied in this literature are not market signals, that is, forms of buying or selling, but involve consumption or gift-giving. The signaling of status through conspicuous consumption was made a well-known concept by Veblen (1899), has been studied by anthropologists extensively, and within economics has been revived recently as a subject of inquiry, notably by Robert Frank (1985), (1999). Inconspicuous consumption can have a signaling dimension too, as where individuals who seek or occupy positions of trust use diet or exercise to keep thin in order to signal a low discount rate, which makes them more trustworthy. (In earlier times, when thinness was a signal of malnutrition or tuberculosis, people may have eaten more than they really wanted in order to signal health and prosperity.)

Gift-giving, also extensively studied by anthropologists, and lately by sociologists and economists as well, provides good examples of personal signaling. Camerer (1988), for example, shows that seemingly wasteful gifts can signal the donor's interest in entering into a serious relationship. A survey conducted by Solnick and Hemenway (1996) found that the two top reasons for liking a gift were that it "showed a lot of thought" and that it "was something that you wanted but felt you should not spend money on for yourself." The first reason is straightforward—the gift signaled that the donor cared enough about the donee to make a real effort to find the right gift—but the second reason is puzzling; why would one feel complimented to receive a gift that one would not want to buy oneself? The answer may be that the recipient can enjoy it without thereby indicating a taste for luxury (possibly implying softness or selfishness), as he would be doing if he bought it himself.

The signaling function of gift giving and of conspicuous consumption is well understood, but signaling by individuals of personal characteristics (such as affluence or generosity) by means of *market* activities (buying and selling, including the renting of one's

labor) has rarely been discussed in the scholarly literature. An exception is Eric Posner, who argues (E. Posner (1997), p. 583):

To say that gift-giving is a useful mechanism for people who want to behave altruistically, enhance their status, or pursue trust relationships is not to say that such people can only use gift-giving to achieve these goals and cannot achieve the same goals by engaging in ordinary commercial transactions. As a matter of theory, people can; as a matter of practice, they usually do not, simply because gift-giving is the more effective mechanism.

He shows that a gift can generally give a stronger signal for a given amount of money expended, whereas signaling by means of a market transaction can be “fuzzy.” The examples he gives are convincing but he does not discuss the question whether there are also cases in which a market transaction may be an even better signaling mechanism. Consider his example of a store whose employees have some discretion in the amount of services rendered the customer, or in the price of the good. Should a customer who wants to befriend the employee, whether in order to get better service or prices in the future or for some personal reason (maybe he would like to date the employee), purchase an extra amount of goods from the employee or give her a gift? A cash gift, as Eric Posner points out, transfers the full amount of resources to the employee; to achieve the same transfer to the employee through extra purchases would require buying more than the customer wanted because the employee would receive only a share (if that) of the profit on those sales.

Another point should be noted, however: if the customer has already decided to purchase the good, then by selecting this store over other stores or by approaching the particular salesperson he would be bestowing benefits on her at little extra cost over the lowest price of the good—less extra cost than if he bought a gift for her. But if the “gift” is costless, or very cheap, to the giver, its efficacy in signaling a desire to befriend is diminished. And it will usually be difficult to make a credible claim to have incurred a big expense to shop at this store rather than another, unless, perhaps, one lives at a great distance, or ostentatiously waits around for a long time while the favored salesperson is waiting on another customer, even though other salespersons are obviously free.

Although this problem is avoided with outright gifts, another problem is created: in a business setting they usually are more visible to third parties and therefore potentially more suspicious than commercial transactions. Gifts can be a form of commercial bribe designed to induce the employee to be disloyal to his principal. Disguising the “gift” as a commercial transaction can make the interpretation more ambiguous, and also more acceptable to the employer because he gets his “cut” (the profit on the sale). Concealing a cash gift by making it in secret, off premises, would be an alternative, but the very effort at concealment would mark it as illicit and thus place both the donor and the recipient in legal jeopardy. People may decide, therefore, to use the market to communicate intentions, dispositions, and so forth—in short, to convey signals. The signal we are focusing on in this paper is not the one sent by possessing or consuming a particular good, but the one sent by the *process* by which the good is purchased or sold. Ownership of a painting by an “Old Master” can signal wealth, but so can the behavior of the owner at the auction at which he acquired it.

II. WHICH MARKETS?

Markets are not all alike in terms of signaling opportunities for the individuals participating in them. Some markets are anonymous, such as stock markets; there is little room for signaling personal characteristics through buying or selling if one is invisible to the other party to the transaction. At the other extreme, some markets involve two individuals dealing directly with each other; the market in babysitting is an example. Markets also differ with respect to whether the signals conveyed by market activity convey information about the sender or about the sender’s beliefs concerning the recipient, or both, as is often the case with gifts as well.

In a typical retail outlet, the consumer is limited to selecting goods at already determined prices, leaving no room for individual negotiation. In such a setting the consumer is limited in his market signaling behavior to the selection of the outlet and of the specific goods sold by it, and to some extent to the timing of purchases, like whether to wait for a discount sale. These choices reflect the consumer’s characteristics rather than his or her belief about the personal characteristics of any salesperson. But if a salesperson steered

a customer away from a particular product on the ground that “you would find it too expensive,” this would convey a negative evaluation of the customer; the salesperson had “sized him up” and decided he was not affluent.

Similarly, suppose you’re invited to a restaurant, and the items listed on the menu vary considerably in expensiveness. Take first the case in which it is expected that you and your host will each pay for his own meal. You’ll be apt to choose an item in the approximate middle of the range. For if you choose a very expensive item, this may be taken as a signal that your host has chosen a “cheap” restaurant, while if you choose a very cheap item, this may be taken as a signal that you can’t really afford a restaurant of this caliber. In the case in which the host is paying for both meals, again you’ll be apt to choose an item in the approximate middle of the range. If you choose a very expensive item, this may signal greed, since you’re not paying; if you choose a very cheap item, this may be taken as a signal that you think your host is not sufficiently affluent to be able to afford to buy you anything more than a cheap meal.

Markets also differ according to whether there is a third party audience to the market transaction, and if so whether the market participants care about the inferences drawn by the third parties. Attending a public auction in a small town (or shopping in a small town in a store where one is constantly bumping into one’s neighbors and friends, who observe one’s purchasing in the store) involves more signaling to third parties than participating in a similar auction on the internet. Whether to actively seek out or avoid opportunities for market signaling depends on whether it is important for one to obtain favorable opportunities for future business dealings; but it depends as well on the person’s taste and competence. Individuals who are not gregarious by nature or who lack social skills worry about acting foolishly or offending people if they engage in market activities in the presence of other people beyond what is unavoidable, and so they may avoid such situations.

The amount and nature of market signaling are sometimes restricted by law, in particular antidiscrimination law. Not being allowed to discriminate on the basis of race, sex, age, religion, or disability impedes a firm in signaling a negative attitude against certain groups but by the same token also makes it difficult to signal positive attitudes. If a woman is hired into a high position, this may

be because the firm is under legal or political pressure to favor women rather than because it has a genuinely high regard for the ability of the individual woman or of women in general.

III. SIGNALING INELASTIC DEMAND, RISK TAKING, AND HIGH TRANSACTION COSTS

Efforts at market signaling generally focus on trying to communicate ability, wealth, and altruism, since these are especially important characteristics for cultivating advantageous business or personal relations. Altruism is worthwhile to signal because somebody with great wealth or abilities might *not* be a person worth knowing—think of Dickens's Scrooge. Wealth is worthwhile to signal because, among other reasons, an altruistic person who has no money may not be worth knowing either. Hence the signaling of more than one characteristic, and in particular wealth or ability plus altruism, normally is more valuable than signaling just one. Granted there is a puzzle about why it is necessary to signal wealth indirectly; one could have one's wealth audited by a reputable accounting firm and post the results on one's Web site for all the world to see. We do not have a complete solution to the puzzle, but we point out that it is common for people to flaunt their wealth while at the same time being reticent about details. In other words, people want to send a "fuzzy" signal of wealth; this may be connected with fear of tax audits, theft, kidnapping, and revealing information to competitors that might be used against one.

Merely *announcing* one's possession of desirable qualities, however, is likely to lack credibility; it is "cheap talk." Such talk is nevertheless very common and not entirely lacking in credibility, its credibility being inverse to the incentive to lie.³ Verbal reassurances of love, friendship and trust are so easy to make that a person who does *not* engage in a lot of cheap talk may be suspect. This is especially likely because most people believe they have at least some ability to detect insincerity in the statements of other people, and so a refusal to lavish praise and engage in the other common forms of cheap talk may be read as fear of being unmasked as insincere.

³ For an excellent discussion of the economics of cheap talk, see Farrell and Rabin (1996).

Talk ceases to be cheap when it is accompanied by the talker's "putting his money where his mouth is," in the sense that if his talk is insincere or misleading he will lose something of value to him. Making talk costly may be essential to its credibility when the incentive to mislead is great. Market behavior can be a method of making talk costly, as we shall argue, but it is sometimes difficult to interpret. If a person "overpays" when making a purchase, does this mean that he is a wealthy altruist worth knowing, or that he has a high cost of time that precludes him from bargaining or shopping carefully, or that he is dumb or inexperienced? Similarly, the person who always buys goods that have high price tags may be too busy to shop and be relying on price as a proxy for quality, but then again he may just be an inept consumer—or maybe he is flaunting his wealth, which might be interpreted as a sign that he is a selfish, vulgar, or boastful person.

High prices for services add additional complexities to the analysis. In the case of fancy resorts, country clubs, and sometimes even schools and neighborhoods, a high price can serve as a sorting device, identifying people with similar tastes or who are otherwise desirable to associate with. The alternative of sorting one's acquaintances on the basis of their apparent qualities, such as charm, sophistication, and good manners, would allow good mimickers to enter one's circle of acquaintances but would exclude people who were bad at presenting themselves, whereas sorting by the purse strings allows into the circle some wealthy people who are not really worth knowing and excludes some people who are worth knowing but lack wealth. In other words, market signaling can be a device for conveying information about personal characteristics that facilitates sorting.

We shall focus on three particular types of market behavior that can signal the possession of attributes such as wealth and ability that are associated with high status in our society. They are inelastic demand, high transaction costs, and risk taking. People who want to signal that they have high status will have an incentive to understate the elasticity of their demand for goods and services, exaggerate their transaction costs as a function of the opportunity cost of their time, and exaggerate their willingness to take financial risks.

We recognize—though for the sake of brevity we discuss the point only in passing—that people sometimes have an incentive to signal the opposite of the traits that we are emphasizing. For example, one very successful trial lawyer in Chicago brags that he has two sets of clothing, expensive and cheap, and that he wears the cheap clothing when he is trying a case to a jury so that the jurors will think that he is like them.⁴ Wealthy people sometimes drive cheap cars, and otherwise live modestly, in order to reduce the danger of robbery or kidnapping, or to avoid being pestered by charity solicitors. The cost of these signals is positive, not negative as it might seem, because the signaler is deviating from the consumption pattern that he would choose were he not concerned with conveying a signal. Some business people may cultivate (again through decisions of what to purchase, and what not) a reputation as a skinflint in order to increase the credibility of their low offers in bargaining situations. In what follows, however, we discuss signals designed to magnify the status or the apparent character of the signaler.

Inelastic Demand. J. P. Morgan is said to have remarked of someone who asked how much a yacht cost, “If you have to ask, you can’t afford it.” In technical economic terms, he was suggesting that a very wealthy person’s price elasticity of demand is zero within a broad range. There is neither a theoretical nor, so far as we are aware, an empirical basis for such a suggestion. Indeed, one can easily imagine cases in which the wealthy person’s elasticity of demand is higher than the poor person’s because the wealthy person, being better educated, is a more savvy shopper, or because he can stock up on discounted brands.⁵

⁴ Of course, if he wore expensive clothing, the jury might infer that he was a very good lawyer. But a very good lawyer is not necessarily the kind of person you trust—rather the opposite! This lawyer also eats in the cheap cafeteria in the federal courthouse when he is conducting a jury trial, because the jurors eat in the cafeteria and seeing him there will think he is like them and therefore trustworthy (they can “read” him because he is like them). This incidentally is an example of market signaling, whereas his choice of clothing is an example of consumption signaling (inconspicuous consumption, in this case).

⁵ For empirical evidence, see Mulher, Williams, and Leone (1998), pp. 440–441.

There are, however, three reasons for expecting the price elasticity of demand to be lower across a large range of goods and services for wealthier people than for poorer people, though of course not zero. First, most wealthy people in our society have high labor incomes and therefore high opportunity costs of time. The full price of a good or service consists of its money price plus the time cost involved in shopping for and consuming it. The larger the fraction of the full price that consists of the time cost, the less responsive demand will be to a change in the money price. Hence if wealthy people have on average a higher opportunity cost of time than other people, their price elasticity of demand for goods and services will be lower than average. Although we emphasize high *labor* incomes, the analysis may hold for the “idle rich,” who clip coupons rather than working. They presumably attach a high value to their leisure activities, and so time spent in shopping has a high opportunity cost for them too.

Second, the price elasticity of demand for a good is likely to be lower, the smaller the fraction of the buyer’s income is spent on that good. Hence for goods such as food which form a smaller fraction of the wealthy person’s purchases than of the poor person’s, we can expect the price elasticity of demand to vary inversely with income.⁶

Third, wealthy people are likely to be more sensitive to subtle variations in goods and services than the nonwealthy are. They are likely, in other words, to be more “picky.” A difference that might not strike the average buyer as important might be so important to the wealthy buyer that he or she will insist on the particular good even if a seemingly very close substitute is cheaper.

For all three reasons, a person who wants to give the impression of being wealthy can be expected to avoid being seen taking time to bargain over the price of goods or services that are not luxuries. (Obviously even a very wealthy person will bargain over luxury items, contrary to J. P. Morgan’s dictum.) This in turn implies reluctance to trade nonluxury goods. If one has manifested a desire to possess a certain coffee mug that is priced at \$2, one will be reluctant to reveal that one would sell it for \$2.50, lest this be taken as a signal of having a highly elastic demand for the good and thus of not being

⁶ For empirical evidence, see Appelbaum and Schettkat (1999), pp. 395–396.

wealthy. (This analysis has implications, discussed in Part VII of this paper, for the analysis of the endowment effect stressed by the Behavioralists.) Or consider an auction with public bidding. Signaling inelastic demand would imply that once you start bidding you'll be reluctant to stop, because stopping will reveal your sensitivity to price, and so you'll find yourself under pressure, for signaling reasons, to go higher than you really want to bid.⁷ The risk of being forced into making such a revelation may discourage would-be signalers of wealth from participating in certain types of auction, because the cost of signaling would be too high. Nonparticipation need not signal lack of wealth, since it may mean nothing more than that the nonparticipant is not interested in the items being auctioned, or in auctions, period.

High Transaction Costs. "Not having time" for comparing prices, traveling to far-away suppliers, cutting discount coupons, or bagging one's own groceries can signal wealth either because these rather boring activities are inferior goods or (our point in the previous section) because a person with a high income will have high opportunity costs of time. But, equally, "not having time" can signal high opportunity costs unrelated to wealth. Anyone who has a well-paying job (but not so well paying as to make him one of the wealthy) could end up poorer by spending time shopping for bargains; his lost income could exceed his savings from paying lower prices.⁸ And some people who have no money at all are simply very busy (including graduate students and new parents). A nonwealthy person may have high opportunity costs of time simply because he loves sports or other leisure-time activities. The only thing that is clear is that being seen engaged in comparison shopping, cutting out discount coupons, standing in line, or engaging in like activities is incompatible with signaling wealth. Hence—once again to anticipate Part VII—we might expect the subjects of behavioralist

⁷ The time cost of goods is particularly evident in this example. If the bidder's bid is rejected, he has to search elsewhere for the good—perhaps attend other auctions.

⁸ The same skills that have led to his high income may make him a better than average shopper, of course, but his marginal product is presumably much greater in the market, since the imputed income from skillful shopping is modest.

experiments to be reluctant to do things that would paint them as bargain hunters.

Reluctance to trade arising from a desire to signal high opportunity costs of time is difficult to distinguish empirically from reluctance to trade arising from a desire to signal inelastic demand, and in fact there is considerable overlap because of the effect of high time costs on the price elasticity of demand. But there is the following difference: the first type of reluctance implies a special reluctance to seek bargains when the ratio of the time required for the bargain hunting to the potential savings is high, while the second type (signaling inelastic demand rather than high opportunity costs of time) implies a special reluctance to bargain over necessities. A person might be reluctant to acknowledge being willing to buy a new pair of shoes only if they cost less than \$40 while being quick to admit that he would not pay that much for a silk scarf. It is less embarrassing to admit that one has a relatively elastic demand for a “frivolous” than for a necessary item. Indeed, this may signal frugality or sobriety rather than lack of wealth, and we suggested earlier that such signals are rational in some circumstances.

Risk Taking. Taking large financial risks is primarily the domain of the wealthy. The clearest case is that of the exclusive gambling casino, where the minimum stakes of a bet are so high, and the potential losses so great, that only the wealthy can afford to play. But business also provides opportunities for conspicuous risk-taking that demonstrates willingness to lose huge amounts of money, implying wealth, provided it is one’s own money that is at risk, not borrowed money, though the ability to borrow really large sums implies wealth.

Taking large financial risks is not only a sign of wealth; it is also a common cause of wealth. Wealthy people are often people who at some time in the past engaged in ventures with high potential payoffs to compensate for assuming a high risk of loss. Some of these successful “gamblers” are merely lucky, but others are able and most are at least daring, and so an added benefit of being seen engaging in big gambles is that it is a signal of courage and ability as well as of wealth.

Gary Becker argues in an unpublished paper (Becker 1999) that status and income are complements, implying that a desire for

higher status will induce risk-taking activities, since a higher status will increase the marginal utility of income. (See also Robson (1992).) If so, risk taking can be a signal that the risk taker is seeking to enhance his status. Conversely, aversion to risk taking by a wealthy person might signal that he has already achieved a very high status and would not experience a significantly increased marginal utility of income if his status were to rise even further.

IV. PRIVATELY OPTIMAL SIGNALING

Signaling involves costs as well as benefits, and let us try now to model the tradeoff. For simplicity we assume only one time period and a given price level. The individual is assumed to care about just two things, nonconspicuous spending (C) and status (S), and thus he tries to maximize $U(C,S)$. " C " primarily refers to consumption that is made for nonsignaling purposes but it also includes nonconspicuous investments made for purposes of increasing nonconspicuous consumption in old age or funding nonconspicuous bequests whether personal or charitable. Whether status is valued for its own sake or as an instrument to obtain other benefits in the future is irrelevant to the model.⁹ We use status merely as an illustration of personal characteristics that an individual might wish to signal.

Status, we further assume, has two components, one that is beyond the individual's control and the other that can be influenced by economic behavior. The fixed component, labeled S^g ("g" as in "given") is determined partly by inheritance from a previous generation, such as inherited wealth, family name, or a noble title, partly by sex and age, and partly by attributes that at some time in the past were partly or completely under the individual's control, such as educational or professional achievements. This fixed or endowed component of status consists of beliefs held about the individual before (or apart from) any efforts that he makes to alter those beliefs through signaling. The discretionary component of status, S^v ("v" as in "variable"), can, unlike the fixed component, be affected by the individual's current decisions. S^v depends on the expenditures incurred in signaling (E). (We assume diminishing

⁹ We discuss the distinction in Fremling and R. Posner (1999).

returns.) E includes such things as the cost of conspicuous consumption (typically only a fraction of the price of the goods and services consumed, since most of the goods and services will have use value as well as signaling value) and the cost of “waste” in gift giving—again, typically some fraction, as most gifts have some use value and some reciprocal gift giving will usually be anticipated. Our concern is with the part of E that is incurred in signaling through the buying and selling process itself. We shall discuss in Part VII the case of a Mr. R who to signal affluence refuses to sell for \$100 a bottle of wine that he had bought for only \$5, even though he never pays more than \$35 for a bottle of wine and so would not be expected to value this bottle at \$100. Suppose the maximum price that he would have paid for the \$5 wine (in the absence of signaling) was only \$7, but, when he was offered \$100, signaling considerations induced him to consume the wine rather than to sell it. Then his “market signaling expenditures” would be as much as \$93.

With a given real income, the individual decides how much resources to allocate to nonconspicuous spending, C, and how much to enhancing status, E. The income constraint is $I = C + E$ and the formal model is

$$(1) \max. U(C,S), \quad \text{with } \partial U/\partial C > 0, \partial U/\partial S > 0, \partial^2 U/\partial C^2 < 0, \\ \partial^2 U/\partial S^2 < 0, \partial^2 U/\partial C\partial S > 0$$

$$(2) S = S^g + S^v(E), \quad \text{with } \partial S^v/\partial E > 0, \partial^2 (S^v)/\partial E^2 < 0$$

$$(3) I = C + E.$$

The first-order condition for a maximum is

$$(4) \partial U/\partial C = (\partial U/\partial S)(\partial S^v/\partial E).$$

In words, at the optimal solution, a marginal increase in resources devoted to nonconspicuous spending increases utility by the same amount as does a marginal increase in resources spent on status signaling.

The exogenous variables are S^g and I . They affect the individual's decision on how much to spend on status seeking as follows:

$$(5) \quad dE/dS^g = \frac{-(\partial^2 U/\partial S^2)(\partial S^v/\partial E)}{\partial^2 U/\partial C^2 + (\partial^2 U/\partial S^2)(\partial S^v/\partial E)^2 + (\partial U/\partial S)(\partial^2 S^v/\partial E^2)} < 0$$

An increase in endowed status (S^g) results in a reduction in the amount of effort devoted to status seeking; in other words, S^g and S^v are substitutes. This can explain the behavioral difference between those who already possess an established status position (such as "old money") and those who don't ("nouveau riche"). Even if the members of the two groups have the same income and the same taste for status (as represented by the utility function), the nouveau riche will spend more on status seeking.

As shown in Equation (6), an increase in S^g raises S by a smaller amount because E and thus S^v are reduced:

$$(6) \quad dS/dS^g = 1 + (fS^v/fE)(dE/dS^g) = 1 - \frac{1}{1 + [\partial^2 U/\partial C^2 + (\partial U/\partial S)(\partial^2 S^v/\partial E^2)]/[(\partial^2 U/\partial S^2)(\partial S^v/\partial E)^2]} > 0, \text{ but } < 1$$

Given the budget constraint (Equation (3)) and that

$$(7) \quad dC/dI = \frac{1}{1 + [\partial U/\partial C]/[(\partial U/\partial S)(\partial S^v/\partial E)]} > 0, \text{ but } < 1$$

it follows that

$$(8) \quad dE/dI = 1 - dC/dI > 0 \text{ but } < 1.$$

Equations (7) and (8) show that as income increases, both nonconspicuous spending and spending on status seeking increase. In other words, as the model is set up, neither is an inferior good.

We have said little about the $S^v(E)$ function itself. It combines all methods by which the individual can devote resources to

increasing his status; what the particular methods are depend on the culture and the individual's place within it. It can be shown that if the function shifts upward, so that a given expenditure yields more status, people may expend more or fewer resources on status seeking. This is just as with ordinary goods: one might spend less, as the lower price enables one to obtain the same benefits more cheaply, or more, in order to obtain still greater benefits.

As between two people who differ only in the cost of acquiring status, we expect the person with the lower cost to acquire more and thus to have a higher status. If the cost is higher for deceivers (in other words, if the cost of producing a truthful signal is on average lower than that of producing a false signal (cf. Milgrom and Roberts (1986)), then a Pareto optimal equilibrium level of market signaling may be achieved.

Suppose now that the people who have the highest status in society do not derive such status from wealth but instead from power or education. (Alternatively, suppose there are different status hierarchies, such as wealth, power, and prestige, that are imperfectly correlated.) This elite would possess a high S^s and therefore choose a low E . That would make it hard for other people to mimic the elite by expending economic resources: lavish consumption or gift giving, or acting as if one didn't care about the price of goods, might be perceived as "vulgar"—indeed as proof that one does not belong to the elite.

In the case of an intellectual elite, the possession of earned wealth might be taken as a signal that the individual had been spending too much time on consulting at the expense of research and other hard-to-monetize university obligations. In a curious reversal, the S^v function would then be expressed as expending resources on concealing wealth. At the opposite extreme, for example during the Gilded Age of late nineteenth- and early twentieth-century America, when the top layer of society was both wealthy *and* new (implying that the elite lacked S^s but had a high I), people wishing to signal membership in the elite would have every incentive to flaunt their wealth.

One observes that children of wealthy families sometimes go into distinctly low-paying occupations, such as art history, architecture, and college admissions. It may seem, contrary to our model in which endowed and purchased status are substitutes, that

these individuals are purchasing status by forgoing income. Our interpretation is different. They are either substituting nonpecuniary for pecuniary income (much like the substitution of leisure for income due to declining marginal utility of income), or actually signaling wealth or high social status by going into low-paying but prestigious occupations that attract other people from wealthy families.

The existence of subcultures complicates the picture but is amenable to our analysis. During the 1960s, there was a wide gap between the culture of the establishment, in which wealth and income were major determinants of status, and a rebellious youth culture composed disproportionately of the scions of upper-middle-class families. Youngsters who had little family wealth or "name" to rely on and no great achievements or promise as students were less likely to rebel, as their self-interest was best served by signaling a willingness to work hard in conventional occupations. Lower middle-class people often dress more carefully than the well to do in order to signal affluence and also conformity to middle-class norms. In terms of the model, people with little S^s may have an incentive to compensate with heavy expenditures on S^v .

V. NORMATIVE IMPLICATIONS

Market signaling can create positive or negative externalities. Consider, first, signaling wealth through exaggerating one's inelasticity of demand for a consumer item. It may seem plain that such signaling creates inefficiency. If someone outbids everyone else in a public auction simply to signal that he is so wealthy that price is unimportant, the item is likely to end up in the hands of a person who does not value the item "itself" the most. But this need not be a misallocation of resources, since the product is bundled together with the signaling and there is a value to signaling. The person choosing this particular means of signaling presumably selected it because it seemed the most cost-effective means of signaling in the circumstances, and he is the one ending up footing the higher price, while the negative externality imposed on the persons who are outbid is offset by the positive externality conferred on the seller, who receives more revenue (that is, these are pecuniary externalities). And unlike the case of conspicuous consumption, no substantial resources are consumed in the signaling, though the normative

significance of the distinction is unclear, since there is no obvious externality when someone destroys his private goods.¹⁰ So long as the signal conveyed by market behavior is positively correlated with wealth or other characteristics desired in a transacting partner—which it should be in general, since mimickers incur a higher cost of engaging in such behavior¹¹—socially worthwhile information is created. To put this differently, signaling can facilitate optimal sorting; we gave an example earlier. Signaling inelastic demand or high transaction costs for consumer goods can also increase social welfare by reducing rent-seeking in the form of negotiating over purchases in an effort to obtain the greatest surplus from the transaction.

The qualifications in the preceding paragraph are important. When market signaling is used to mislead, or when it consumes substantial resources merely to achieve a positional advantage, there is social waste. The second of these concerns is particularly activated by status signaling, since status is a positional good. If raising your own status by signaling it more effectively reduces someone else's, then your expenditures on raising your status have imposed an external cost. The external cost need not, however, exceed the benefit to you. If people who succeed in status competition are on average those who value a high status the most, then the reallocation of status is welfare-enhancing. In any event we doubt whether there are any public measures that would reduce this waste at a cost less than the benefit, especially since efforts to discourage market signaling might deflect people to socially more costly methods of signaling the possession of desired traits.

We have emphasized market signaling in consumer markets but wealth and altruism can also be signaled in labor markets, for example by donating one's time to good works, such as serving on

¹⁰ In fact, there is no social cost if the conspicuous consumption takes the form of literally burning money, which is a claim on goods rather than a good. Indeed, by reducing the money supply, burning money increases the wealth of the rest of the community!

¹¹ The fact that it is often difficult to deceive people has led evolutionary biologists to suggest that "selection for deception and avoiding being detected may select for self-deception in the deceiver the better to hide the ongoing deception from others." Trivers and Burt (1999), p. 17.

the board of a hospital or museum or working Sundays in a soup kitchen. Efforts to reduce this signaling would undermine altruism. Of course, there is something of a paradox in the concept of “signaling altruism”; a pure altruist acts purely for the sake of altruism rather than also to enhance his reputation. But it is common for people both to be generous and to seek a reputation for being generous.

Economic theory might be thought to predict that “volunteers” would work harder if they were offered a small hourly compensation, but this is wrong; the offer of money would be viewed as an insult, challenging the *motivation* behind volunteering. Acceptance of compensation would not only obscure the signal of altruism but also raise questions about the sincerity of the volunteer’s support of the activity for which he had volunteered. Similarly, rules that *compel* altruistic behavior, such as the rules that require lawyers to donate some of their time to “pro bono” activities such as representing the indigent, can backfire by destroying the signal of altruism. Lawyers do not get fully credited for being altruists when they engage in such activities because they may be thought to be doing so as a matter of duty rather than of choice.

Traditionally, much volunteer work was performed by well-to-do women. Their undertaking to perform unpaid work signaled that they had married well enough (or had other sources of unearned income) not to have to work. To the extent that signaling motives evoke socially valuable work, it promotes social welfare. Volunteer work, however, is only a small part of all work performed. For most workers, a low salary signals not altruism or wealth but merely that the worker is not very productive. There are exceptions: monopsonistic labor markets, such as military service (where there is only one potential employer), in which salaries are artificially depressed; and markets in which a large fraction of compensation takes the form of leisure or other nonpecuniary benefits, such as teaching and art. But in general a high salary signals ability, and therefore a worker will strive hard to obtain a high salary not just for the strictly materialistic benefit but also for the valued personal characteristics that the salary signals. By the same token, a person whose wealth or other qualities are strongly signaled otherwise than by earned income (for example, a person known to have inherited a huge amount of money) has less incentive to seek a high-paying job

because the signaling value of holding such a job is less for him than it would be for other people. As we pointed out earlier, some occupations, such as architecture and university administration, traditionally paid little, in part because they were attractive to wealthy people. But to the extent that a high salary is valued as a signal, a worker may solicit job offers even if he doesn't want to leave his present job and his marginal utility of income is low at his present wage; in this way, signaling can exacerbate rent-seeking and thus have a negative effect on overall social welfare.

VI. MISSING MARKETS

Up to now we have largely ignored the case in which a market activity conveys a signal about the *other* party to the transaction—for example that he is needy or dishonest. The possibility of emitting this kind of negative signal and thereby offending a potential transaction partner can affect one's market behavior because it normally is not in one's interest to be considered a rude person. Indeed, if the other person has to “pay a price” in terms of lowered status for dealing with you, you may have to compensate him by offering unusually good monetary terms. The “price” can be so high that people will sometimes refrain from making offers of transactions that in the absence of signaling considerations would be mutually beneficial. While according to standard economic thinking more choices are better, or at least not worse, than fewer ones, once signaling is brought into the picture it becomes apparent that an offer sometimes can harm the offeree by signaling a belief that he is poor, unskilled, desperate, or untrustworthy. An offer of a job that is “beneath” you could harm your employment prospects by signaling to the world that the offerer thinks that your prospects are poor.

Analogous considerations may explain why very few people would consider asking a neighbor or colleague to mow their lawn or clean their house for money. This reluctance is often discussed under the rubric of incommensurability—the idea that certain goods cannot be compared through the medium of money. Supposed instances of incommensurability can, however, often be explained in terms of signaling (see E. Posner (1998), pp. 1202–1206). The request would signal a belief that the neighbor or colleague is so necessitous, or perhaps so lacking in pride or self-esteem—or so greedy—that he is willing to do low-status work. In other words,

the offer conveys a negative signal about the offeree. But context is all-important. Many adolescents do mow lawns for money and so it would not be rude to inquire whether a neighborhood kid would do yardwork. The difference is that few adolescents, even those possessing considerable status within their cohort, are able to find part-time, high-paying, prestigious jobs. Even if his parents are wealthy, the adolescent may be expected to work so as to learn to shoulder responsibilities, or he may work for pin money to spend on luxuries that his parents deny him as inconsistent with building character. Since everyone knows that the adolescent is not a high-class worker, a proposal that he do yardwork is not a challenge to his status and therefore is not offensive (and likewise, of course, if the proposal is to a person known to make his living as a yardworker). Also different is the case in which you ask your neighbor or colleague to do something for you as a “favor,” for here the signal is that he is altruistic, not that he is poor, desperate, or lacking in a sense of self-worth.

Another example of how activities can emit bad signals when they are converted to market activities is that suggestions of consensual sex *without* any payment are vastly more acceptable than suggestions of sex for pay. It is not the transfer of resources per se that is objectionable; it is commonplace to make gifts to a sexual partner, or for a wife in a traditional marriage to get half the husband’s salary in implicit exchange for services prominently including sex. The offensiveness arises from the implications about the nature of the relationship and the status of the intended recipient of the money.

The point is applicable to goods as well as services. Suppose that a friend shows you a coffee mug and remarks that he bought it for \$3 at a certain store. He would be offended if you tried to buy it from him for \$4. For this would suggest either that his time is not valuable and therefore he is willing to incur the inconvenience of going and buying another mug (and you are not) or that he is so hard up that a dollar is important to him. The offense would be greater if he has made clear that it is a good that he cherishes despite its small monetary value (a family heirloom, for example) and less if the opposite is apparent, as in the case of clothes that one’s children have outgrown. Yard sales are generally of this character—people selling what they want to get rid of, less to get money than to clear

space for things they want to buy. Hence it is not a humiliation to be observed selling consumer goods in the context of a yard sale—although donating the goods would send a stronger signal of wealth.

Negotiating over the price of cheap consumer goods is uncommon in Western cultures (the suburban yard sale being a rare and, as we have just seen, readily explainable exception). Although the main reason may simply be high time costs, another reason is that negotiating creates a situation in which one may have to reveal the elasticity of one's demand, with implications about one's wealth that may be embarrassing. The existence of a nonnegotiable, "take it or leave it" price avoids this possibility. By buying at that price the buyer reveals only that the maximum that he is willing to pay for the item is equal to or above the set price. Individuals whose maximum willingness to pay falls below that price need not be embarrassed, as this maximum is never publicly revealed; such persons are indistinguishable from those who simply do not like the item.

Sometime the potential for embarrassment is unilateral. Markets deal with this for example in an auction in which the potential consumers are identified (and so may reap a benefit in signaling wealth) but the seller—who may be someone who has fallen on hard times and wants to sell inherited valuables—is concealed.

Often it would be offensive to ask somebody else to do a task for money yet it is not degrading to do it oneself. Generally one is not embarrassed to be seen working in his own yard. Working in one's own yard can have recreational benefits and signal a conscientious concern with the appearance of one's property, blurring any signal that one is doing one's own yardwork because one can't afford to hire someone else to do it. For that matter, there is no embarrassment in being seen working in the neighbor's yard if one is not being paid; one might be working there out of altruism or because one did not have one's own garden—for reasons unrelated to lack of wealth!

We have been discussing what we call "reluctance to suggest trade" and it is natural to ask whether the root of the problem is the offer of money as distinct from something else of value. We think not. If you offered your neighbor a sack of potatoes to mow your lawn, this offer would be as offensive as its cash equivalent. What

makes people associate offensive offers to trade with money is that when the trade involves goods or services on both sides rather than goods or services on one side and money on the other, the offensiveness of the signal is often obscured. Swaps of services may be motivated by a desire to avoid income taxes or to economize (as in carpooling), or may be a form of socializing, as when mothers swap babysitting services with each other.

In an interesting experiment, Boza and Diamond (1998) find that when a friend is selling to a friend, he offers a lower price than when he is selling the same good to a stranger; but when a friend is buying from a friend, he does not seek a lower price than when he is buying from a stranger (p. 561). Our analysis provides a straightforward explanation. The seller signals generosity to the friend by offering a discount, anticipating future transactions (one definition of friendship) and therefore wishing to signal a good character, while the buyer signals affluence to the friend by not “angling” for a lower price.

VII. USING SIGNALING THEORY TO INTERPRET THE EMPIRICAL EVIDENCE ON BEHAVIORAL ECONOMICS

A debate began about twenty years ago over what appeared to be a widespread reluctance to trade that seemed inconsistent with the economist’s normal model of human behavior. The central puzzle was why “willingness to accept” (that is, the seller’s minimum demand) seemed often to exceed “willingness to pay” (that is, the buyer’s maximum offer) for the same item (see Bishop and Heberlein (1979); Knetsch and Sinden (1984)). An explanation was sought in the “endowment effect,” implying that the underlying cause of the disparity was the endowment itself (that is, who possessed the item in question), thus implicitly downplaying other factors, such as transactions costs (see Thaler (1980); Kahneman, Knetsch, and Thaler (1986)). Sometimes the debate was cast in terms of whether the Coase theorem is valid. The relevant literature is by now huge, including descriptions of classroom experiments on lottery tickets, coffee mugs, chocolate bars, and other small items which the experimental subjects prove curiously reluctant to trade or sell. There is much more to behavioral economics than reluctance to trade (for a useful bibliography, see Sunstein (1999)), and so the critique that we offer of behavioral theories is limited.

The endowment effect, if it exists, is merely the description of a phenomenon. The challenge to rational-choice theory comes from the behavioralist claim that the effect reflects a reluctance to trade that is due to cognitive problems (for example that people have a better understanding of out-of-pocket costs than of opportunity costs), and to “fairness” concerns (that people have a strong sense of entitlement to what they possess), that are inconsistent with rationality, or at least with the economist’s normal conception of rationality. Alternative explanations consistent with rationality have been proposed (see Hoffman and Spitzer (1993), R. Posner (1998)), but without relying on signaling. As we have already hinted, we think that signaling provides an explanation that is thoroughly consistent with the economist’s normal conception of rationality.

An influential paper by Richard Thaler presents several puzzling cases including that of Mr. R, who bought a case of good wine in the late 1950s for about \$5 a bottle. “A few years later his wine merchant offered to buy the wine back for \$100 a bottle. He refused, although he has never paid more than \$35 for a bottle of wine” (Thaler (1980), p. 43). Our explanation is that R wants others to view him as being well-to-do and (or) having high opportunity costs of time. Were he a professional wine trader he would be proud to make a large profit by selling the wine at a high price. But his role is that of a consumer, who by refusing the high offer of \$100 signals that he can afford to consume the wine even though his opportunity cost of doing so, \$100, is high. He also signals that he is too busy to be bothered by such a trivial matter as returning a bottle of wine to the dealer in order to get \$100. His unwillingness to pay more than \$35 a bottle does not signal poverty, because not all wealthy people value wine highly; it might even signal a disdain for hedonistic consumption.¹²

Thaler’s second example (still p. 43) is that of “Mr. H [who] mows his own lawn. His neighbor’s son would mow it for \$8. He wouldn’t mow his neighbor’s same-sized lawn for \$20.” We discussed this type of case earlier; but the third case that Thaler presents (pp. 43–44) is, at least superficially, very different:

¹² Habit may be an alternative explanation for inertia in responding to new opportunities. For an interpretation of habitual behavior as rational, see Becker (1996), ch. 6.

Two survey questions: (a) Assume you have been exposed to a disease which if contracted leads to a quick and painless death within a week. The probability that you have the disease is 0.001. What is the maximum you would be willing to pay for a cure? (b) Suppose volunteers were needed for research on the above disease. What is the minimum payment you would require to volunteer for this program? (You would not be allowed to purchase the cure.)

According to Thaler, the typical response to (a) is only \$200 but to (b) is \$10,000. No doubt with college students a liquidity effect can explain part of the discrepancy, but a more interesting possibility is that being put in a situation (in (b)) of being deliberately exposed to a disease is degrading, as it resembles experiments on laboratory animals, prisoners of war, and inmates of prisons and insane asylums—all “persons” of low status. There is no comparable connotation to refusing to purchase an expensive cure. So while the probability of death is the same in (a) and (b), the latter involves an additional cost, that of emitting a negative signal.

Behavioralists emphasize the importance of “framing”: how a problem is phrased, they argue, may determine a choice between two logically identical solutions. So we read at page 52 of Thaler’s article of a “Mr. A [who] is waiting in line at a movie theater. When he gets to the ticket window he is told that as the 100,000th customer of the theater he has just won \$100. Mr. B is waiting in line at a different theater. The man in front of him wins \$1,000 for being the 1,000,000th customer of the theater. Mr. B wins \$150. Would you rather be Mr. A or Mr. B?” Some people choose to be Mr. A and one possible interpretation is that \$150 looks smaller than \$100 when it is being compared to \$1,000 although actually of course it is larger. But there is a possibly offsetting factor once signaling is taken into account. Mr. A is a winner; Mr. B a loser who received a large booby prize. Although no accomplishments are involved in this example, being a winner draws attention to oneself and may create a reputation of one’s being “lucky.” Consider now a competition of skill rather than pure luck. The fastest runner will receive more status from being Number One than from being faster by some particular number of seconds than the second-best runner. Rank

order, because it conveys the *essential* information so efficiently (which is why many prospective employers would prefer to know a candidate's class rank than his grade-point average), can have a value in itself that a small sum of money cannot equal.

We may seem to be "picking" on a relatively old paper, ignoring a mass of experimental evidence generated since that yields results similar to those in his paper. But we are not questioning the behavior that Thaler predicts and that later experiments (some of which we will discuss) report; we are offering an alternative explanation. Signaling is *to* someone and therefore in experimental settings, where the reaction of the professor and the other students to any signaling implicit in the subject's response could be important, we predict that the degree of anonymity will affect the outcome. Most of the WTA>WTP experiments have maintained participant anonymity only in the sense that the answers that the experimental subjects give to the questions are not announced. The tradeable goods in these experiments are usually worth only a few dollars, while the opinions of the professors and of fellow students are likely to matter greatly to each of the participants in the experiment provided complete anonymity is not assured. It is plausible, therefore, that participants would demonstrate some degree of self-consciousness in their answers and hence that the answers would be likely to contain a signaling component. The prospect of future classroom discussions or informal chats between students after the experiment can also affect the students' responses. For example, if somebody after the experiment claimed in a conversation to have answered a question in a certain way, but classroom discussions later revealed that all answers fell in a different range, the lie would become apparent.

Consider in this regard the experiment reported in Knetsch and Sinden (1984) on whether WTA exceeded WTP for lottery tickets. The tickets generally traded for very high prices, much higher than the expected payoff. A follow-up survey revealed that the students had been anxious to participate in the lottery because (p. 513 n. 8) the "social pleasure of participating in the lottery with the group outweighed the value of the prize." If social influence has such a large effect on the value of the stakes, it is plausible that signaling, a form of social interaction, could also explain much of the seemingly irrational behavior of the experimental subjects. Bar-Hillel and Neter

(1996) also comment at length on the possible influence of social factors (p. 23) and in particular (p. 24) quote a student in one experiment calling out “Is this ‘Candid Camera?’” and another (in a study much like the coffee mug one but involving pens instead) “I feel silly waiting around to exchange one pen for another for just a shekel, but it seems to be the ‘correct’ thing to do.” It is “silly” to sit around for a small transaction because usually it signals low opportunity costs of time.

The best-known experimental study of reluctance to trade is the one that Kahneman, Knetsch, and Thaler (1990) conducted with Cornell coffee mugs. According to their interpretation, transactions costs were negligible and so only the endowment effect could explain why those students who were given the mugs at the outset of the experiment demanded a much higher price (roughly twice as high) as the others were willing to pay, with the result that there was very little trading even though the initial distribution of mugs was random rather than being based on how much the students valued them. In contrast, there was no reluctance to trade tokens redeemable in cash. We interpret these results in terms of our earlier analysis as a case of general reluctance to sell consumer goods in response to a small increase in price because willingness to sell would signal an elastic demand and hence that the person is not affluent. When the items to be traded are tokens rather than consumer goods, this reluctance disappears because a willingness to transact in tokens (= currency) does not signal lack of affluence. Another possible, though we think less plausible, signaling explanation is that the recipients perceived the mugs as gifts. To turn around and sell a gift signals disrespect for the donor, as it implies that he was unable to choose a gift that would please the recipient. There is no similar effect with a gift of tokens (cash), since of course the recipient of cash is expected to spend it.

In the experiment reported in Loewenstein and Issacharoff (1994), whether one received a coffee mug depended on how well one scored on a test administered at the beginning of the experiment. When it was the low scorers who received the mugs, they did not value them any more highly than the high scorers who did not receive them. But when high scorers received them, they valued them much more highly than the low-scoring nonreceivers. Our interpretation is that when received by low scorers the mugs

were in the nature of booby prizes and this lowered their value because possession of them conveyed a negative signal; it marked the possessor as a low scorer.

A different class of experiments goes by the name of “dictator” and “ultimatum” games and tests for the influence of altruism and concepts of fairness on the behavior of the experimental subjects; there is no claim about cognitive defects. In the dictator game the subjects are instructed to divide a sum with another person, as in “if you get \$10, how would you split it with another subject in a different classroom?” In the ultimatum game the person deciding on the split must take the second person into account because the latter has the power to reject the offer, in which case neither one receives any money.

In the dictator game a high fraction of the “dictators” give nontrivial fractions of the stakes and in the ultimatum games the fractions are even higher. The experimenters explain the difference by the offerer’s concern that the offeree will reject a highly unfavorable split because he will consider it “unfair” or “insulting.” A consistent explanation that preserves rationality in the usual economic sense is that an individual who gives something *voluntarily*, as in the dictator game,¹³ signals that he is an altruist or at least that he cares whether others *think* he is an altruist, while a small offer in the ultimatum game not only signifies a lack of altruism (or lack of caring about being thought an altruist) but also is a challenge to the offeree’s status. As one of us put it in an earlier paper, “Why won’t [the offeree of a penny in the ultimatum game] take the penny? For the same reason that I would not kiss Professor Sunstein’s feet for \$1,000 even if the offer were in private. The offer of the penny would signal to the respondent the proposer’s belief that the respondent holds a low supposal of his own worth, that he is grateful for scraps, that he accepts being ill-used, that he has no

¹³ Another possibility of course is routine or habitual behavior. The dictator game resembles tipping, see Ruffle (1998), p. 258, a social norm “enforced” by the dirty looks that a waiter will give a person who fails without cause to leave a tip within the customary range. Signaling behavior may be habitual and may thus carry over from “real life” settings in which it is rational to experimental settings in which it is not. But we do not pursue this point in this paper.

pride, no sense of honor” (R. Posner (1998), p. 1564).¹⁴ By accepting the offer, then, the offeree would be signaling his agreement with the offerer’s assessment of his character, and this signal would harm the offeree in future transactions either with the same offerer or with anyone who learned that the offeree had accepted a penny offer. Rejecting the offer is therefore perfectly rational. And knowing this the offerer will fear rejection and will therefore have an incentive, quite apart from his own signaling motives, to make a much more generous offer.

The respondent by refusing the ungenerous offer is also signaling his affluence. The price of signaling pride, self-esteem, or related personal characteristics by such a refusal is forgoing the money offered by the offerer. The wealthier the respondent, the higher his marginal rate of substitution of nonpecuniary for pecuniary goods.

Even if all the transactions in an ultimatum game are private, there is nothing to prevent participants from telling other people about them. That is, whenever anonymity is less than complete, there is some likelihood that the negative signal conveyed in a “private” encounter will eventually be publicized. Hoffman, McCabe, and Smith (1996)¹⁵ find that the degree of anonymity indeed affects the outcome of the dictator game. The more anonymous the game, the smaller the “dictator’s” gift. In the most anonymous game, more than 60 percent of the players gave nothing and fewer than 20 percent gave more than \$1 (out of a possible \$10), while in the least anonymous game the corresponding figures were 40 percent and 40 percent. These results support the signaling hypothesis, and the authors offer an explanation similar to ours.¹⁶ An accidental finding that they made bolsters the hypothesis by revealing students

¹⁴ For empirical evidence supporting this interpretation of the ultimatum game, see Güth and van Damme (1998).

¹⁵ The double-blind experiments reported in the 1996 study were earlier described in Hoffman, McCabe, Shachat, and Smith (1994); see also Hoffman, McCabe, and Smith (1995). For similar results, see Bohnet and Frey (1999a), (1999b); Eckel and Grossman (1998).

¹⁶ In their 1994 article they explain the result in terms of the “social concern for what others might think, and for being held in high regard by others,” while in a later article (Hoffman et al. (1998), p. 340) they talk specifically of “signaling.”

signaling deliberately by disobeying the experimenters' instructions. In an experiment in which a high degree of anonymity was supposed to be guaranteed by requiring each "dictator" to place his gift in a sealed envelope, many students did not do so and their choice was not random. "There was a pronounced tendency for those leaving no money to seal their envelope, and for those leaving positive amounts of money to not seal their envelopes" (Hoffman et al. (1996), p. 656). And Bolton and Zwick (1995), mindful of the argument (which they call the "anonymity hypothesis") that the players may be trying to impress the experimenter, find that anonymity increases the willingness of offerees in the ultimatum game to accept the offering player's "ultimatum."¹⁷

VIII. TESTABLE IMPLICATIONS

The fact that alternative explanations are available to account for the results of some of the behavioral experiments does not prove that the alternative explanations are sound. In principle, a body of data can always be explained by an indefinite number of different theories.¹⁸ To discriminate between the alternatives, we need to devise tests that the alternative theories predict different outcomes of. This is difficult to do because many of the data are consistent with both the behavioral and the rational-choice approaches. Rational-choice theorists have long believed, for example, that altruism is a common argument in a rational individual's utility function. Therefore, especially when the players in the ultimatum or dictator game are students in the same class, acquainted with each other and to some extent, at least, friends, or when the prospective offerees are traditional objects of charity (as in Eckel and Grossman (1996)), we would expect a degree of altruistic behavior even if none of the players had, as posited by the behavioralists, a concept of "fairness." And we would expect the tendency to be altruistic to be amplified by the benefits for one's reputation of appearing to be

¹⁷ To similar effect, see Fong and Bolton (1997).

¹⁸ For example, if a set of data can be explained by Theory A, it can also be explained by Theory A + B, provided that B doesn't contradict A, and likewise by Theory A + B + ...n, provided there continues to be no internal contradiction.

generous and trustworthy.¹⁹ Camerer and Thaler (1995), p. 216, claim that “the outcomes of ultimatum, dictatorship and many other bargaining games have more to do with manners than [with] altruism” because by turning down small offers the respondents in the ultimatum game show that they are not altruistic toward the offerer. We agree that altruism is not the complete explanation for these outcomes, but not because there is any contradiction between the behavior of the “dictators” in the dictator game and the behavior of the respondents in the ultimatum game. Only saints are altruistic toward people who insult or otherwise mistreat them. Hence we are not surprised to find that respondents in the ultimatum game do not turn down stingy offers when they know that the offer is made by a computer, Camerer and Thaler (1995), p. 215, since there is neither a revenge motive nor—as we would stress—a signaling motive for rejecting such an offer. Notice also that the “revenger” who turns down the small offer in order to keep offerers “honest” is a kind of altruist; his self-sacrificing behavior contributes to the maintenance of an efficient social order.

We regard the use of the term “manners” to explain nonaltruistic outcomes in the ultimatum and dictator games as in any event misleading. The term connotes an unthinking reflex based on early training or “culture” and remote from considerations of self-interest. In our analysis, the behavior that Camerer and Thaler classify as displaying good manners is explained as rational self-interested signaling behavior.

Another area of overlap between behavioral theory and rational-choice theory concerns the costs of information, a secure part of conventional rational-choice analysis. Although behavioralists tend to be concerned with the individual’s ability to *process* information that is available to him, while rational-choice analysis focuses on the *transfer* of information between individuals (and hence on asymmetric information), processing costs may explain some of the results of the behavioralists’ experiments without any need to posit cognitive quirks or irrationalities (Fremling and Lott (1996), (1999)). Such costs, however, are rarely high enough to be a plausible explanation for nontrivial behavior in which the individual’s self-

¹⁹ For evidence of this, which further supports our signaling interpretation of behavioral experiments, see McCabe, Rassenti, and Smith (1998).

interest is seriously engaged. In cases such as that of Thaler's Mr. R and Mr. H, the complexity of the problem does not seem great enough to explain the behavior; it is difficult to believe, for example, that Mr. R could not comprehend that selling the bottle of wine would put \$100 in his pocket, and that \$100 is greater than \$35. In such cases, signaling theory rather than analysis of processing costs provides the rational-choice alternative to the behavioral theory.

The competing theories do have some different empirical implications, however. As just suggested, we, but not the behavioralists, expect less "generosity" in either the ultimatum or the dictator game when the players are strangers to each other, since both altruistic and signaling incentives are diminished by social distance. In addition, we, but not behavioral analysis, predicts a systematic and substantial difference between the behavior of firms and the behavior of individuals. Firms are less likely to try to signal altruism than individuals are, because the signal would be disbelieved to a great extent. Firms do make corporate gifts, but these are often interpreted cynically as forms of advertising or public relations, and firms' frequent efforts to depict themselves as "socially responsible" are also often interpreted as designed to ward off government regulation. Nevertheless, these are examples of attempts by firms to signal altruism; we simply do not expect them to be as common as in the case of individuals. Nor are they as likely to flaunt their wealth as much as individuals, since a perception of "obscene" profits can attract government regulation; nor are they concerned with social status. It would be worthwhile, therefore, to conduct experiments in which the experimental subjects are instructed to act as agents of firms rather than as principals in their own right. If our analysis of market signaling of personal characteristics is correct, the results of such experiments should differ systematically from those discussed in this paper.

We predict that people with inherited wealth will make a larger fraction of their charitable giving anonymously than people of similar wealth that they have acquired rather than inherited. This prediction follows directly from our model, in which endowed and acquired status are substitutes. The person of inherited wealth has less incentive to signal wealth by making a charitable gift that is known to have come from him.

More can be done to test the effect of anonymity on signaling. The degree to which behavior in an experimental setting is concealed from the other players and the experimenter can readily be altered by altering the size and composition of the audience for the game. We expect the behavior of the players to differ depending on whether the audience includes persons (such as teachers and fellow students) with whom the players anticipate future transactions. In effect, nonanonymity is a condition of signaling; in a situation of complete anonymity, the source of any signal is unknown and so there is no incentive to signal.

Age and occupation of players can be varied, too, and these are relevant variables in our signaling theory because, to take an example involving age, we expect young adults to engage in signaling more than older adults. The young have a strong incentive to form personal and professional ties because they will have a long time within which to reap the benefits of those ties. Similarly, signaling should be more important to people who are engaged in jobs requiring trust, that is, jobs in which the worker's performance is not continuously monitored, so that signals of characteristics (such as having a low discount rate) positively correlated with good performance are important to the employer. We might expect students at elite universities to engage in more signaling than students in vocational high schools; they would avoid playing the ultimatum or dictator games in a way that suggested they were rapacious, greedy, or inconsiderate. And if the job is one in which the worker is acting as an agent of a profit-maximizing firm, we expect the worker to be less concerned with signaling that he is altruistic than if he is a principal, since altruism by an agent can be a signal that he is a disloyal agent. We also expect urban people to engage in less signaling than rural people, because urban markets tend to be more impersonal, and as noted earlier, signaling is less feasible the more impersonal the market.

These observations lead us to suggest the following concrete experiments:

1. Vary the degree of anonymity in the ultimatum and dictator games. To maximize variance, conduct some of the games with no effort to conceal the players' behavior—and in those totally public games, quiz the audience on what opinions they formed of the

character of the different players on the basis of their observations of how the players behaved in the game.²⁰

2. Conduct auctions of items valued by the type of person who is the experimental subject, but vary the degree to which the auction is public. We expect that the more public the auction, the fewer the bidders but the higher the bids.

3. Administer the same dictator or ultimatum game at schools that differ in the fraction of their students that go on to occupy positions of trust in the economy, and to people who differ in age, occupation, and whether urban or rural.

4. Conduct games in which the players are instructed to behave as agents for profit-maximizing firms rather than as principals or as private individuals.

5. Conduct surveys to elicit information on the circumstances in which the respondents would mow a neighbor's lawn or render other services to people whom they know well versus to strangers.

²⁰ We are mindful of the danger pointed out in Loewenstein (1999), p. F30, that "it is natural for subjects to infer from the elaborate measures taken to ensure anonymity that they are supposed to behave in a way that they would not like others to observe." In other words, ostentatious anonymity may cause the participants to behave *more* selfishly than they would in a counterpart real-world setting.

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Readers with comments should address them to:

Gertrud M. Fremling (Ph.D. in Economics, UCLA)

GFremling@aol.com

Richard A. Posner
Senior Lecturer
University of Chicago Law School
1111 East 60th Street
Chicago, IL 60637

richard_posner@ca7.uscourts.gov

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