

# Physical Attractiveness, Opportunity, and Success in Everyday Exchange<sup>1</sup>

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The role of perceived physical attractiveness in everyday exchange is addressed using a laboratory paradigm that examines both play-versus-not-play and cooperate-versus-defect choices in an ecology of available prisoner's dilemma games. The analysis considers the actions of both subject and other in encounters where exchange relationships are possible and include perceptions of others' and own physical attractiveness. Results indicate that subjects are more likely to enter play and to cooperate with others they find attractive. Men who see themselves as more attractive more often cooperate than other men, while women who see themselves as more attractive less often cooperate than other women. In addition, subjects who rate themselves as highly attractive are more likely to cooperate with others they see as also highly attractive. Subjects expect others whom they see as attractive to cooperate more often. At the same time, the effect of perceived attractiveness on choice is independent of these expectations, supporting the hypothesis that attractiveness is a "taste" or "benefit" for actors in exchange relationships.

Exchange theory sees social action as an ongoing interchange between rational individuals who decide what to do based on the relative costs and benefits of the alternatives with which they are confronted. The cur-

<sup>1</sup> Authors are listed alphabetically. Ruth Bennett, Robyn Dawes, Roland Good, Satoshi Kanazawa, Robert O'Brien, and Joe Stone provided valuable substantive and methodological suggestions at various stages of our work. Tomonori Morikawa originally proposed that we should pay attention to the role of subjects' attractiveness in their interpersonal decision making. Direct correspondence to Jean Stockard, Department of Sociology, University of Oregon, Eugene, Oregon 94703.

rency of exchange is not, of course, just goods and money; theorists generally recognize the importance of exchange involving nonmaterial things such as love, esteem, approval, and affection. But the essence of the theory is that individuals are rational actors looking after their interests—as they see them—in the best way they can (Homans 1950, 1961; Cook and Whitmeyer 1992; Cook 1991). In this article, we address the role of *personal attractiveness* as people go about making the decisions that they must make in an ecology of opportunities for exchange with others they encounter.

We know that physical attractiveness is a major asset in sexual exchange and is associated with upward economic mobility in particular for females (Elder 1969, 1974; Holmes and Hatch 1938), and we also know that it brings substantial economic gains in the labor market (Biddle and Hamermesh 1996; Bosman, Pfann, and Hamermesh 1996; Hamermesh and Biddle 1994; Hatfield and Sprecher 1986; Lillard 1995; Quinn 1978; Roszell, Kennedy, and Grabb 1989; Umberson and Hughes 1987). But many encounters that have the potential to make a big difference in our lives do not involve sexual exchange—or the prospect of it—and do not involve the roles of employer, employee, or customer. Such “everyday” exchange relationships, as we call them, can be informal and transitory or more formal and sustained. In the former category, people might exchange useful information and go their separate ways, a relatively common event among strangers at academic conferences, for example. In the latter category, no less familiar, scholars might engage in research collaborations or exchange help with administrative chores both within and between units of a university.

Labor market and sexual exchanges are, of course, often very important to the welfare of those engaging in them, but the fabric of life in any institution or social context consists, in substantial part, of many opportunities for much less portentous exchanges whose effects, in aggregate, might be no less important. In the present article the first question we ask is, *Does perceived physical attractiveness have distributional implications in everyday exchange—as we know it does in sexual exchange and in the labor market?*

Any such implications, if they exist, must be a result of particular choices made by people when they confront opportunities for such exchange (Shall I play with this person or not?) and when they are actually involved in a consummated relationship (*How* will I play in this relationship?). Accordingly, our second and more important question is, *If perceived physical attractiveness does have distributional consequences in everyday exchange, what is the pattern of choices that produces those consequences?*

## THEORETICAL CONTEXT

We model exchange involving two parties as the standard prisoner's dilemma choice between cooperating and defecting. By definition in the prisoner's dilemma, mutual cooperation provides two individuals with a modest gain, but unilateral defection (when the other cooperates) produces a still greater gain while forcing the other into the sucker's role—the lowest available payoff. Alternatively, if both defect (which is a dominant incentive), both take a payoff that is worse than any but that going to a sucker.<sup>2</sup> The prisoner's dilemma nicely captures the standard idea that exchange makes mutual gain possible, but that it also involves an element of risk, which originates in the fact that defection is dominant for both parties.

As a number of recent studies (e.g., Morikawa, Orbell, and Runde 1996; Orbell and Dawes 1991, 1993; Orbell, Dawes, and Schwartz-Shea 1994; Orbell, Schwartz-Shea, and Simmons 1984; Orbell, Zeng, and Mulford 1996; Schuessler 1989; Stanley, Ashlock, and Tesfatsion 1994; Vanberg and Congleton 1992; Yamagishi 1988; Yamagishi and Hayashi 1996) have recognized, however, there is an important *prior* choice not captured by this standard formulation: As an everyday fact, most people most of the time do not *have* to play such games, but when presented with games they must make the choice between playing and not playing in each particular case, as well as the choice between cooperating and defecting. Granted that two individuals encounter each other in circumstances that make an exchange relationship possible, the welfare of each might be influenced not only by their own and the other's cooperate-versus-defect choice, but also their own and the other's play-versus-not-play choice. The full set of choices that bear on individuals' payoffs in such circumstances is specified in figure 1.

In these terms, when two individuals (subject and other) encounter each other in conditions that make an exchange relationship possible, personal attributes (such as physical attractiveness) could affect any or all of the following four choices and have distributional implications as a result:

<sup>2</sup> When  $t$  = free rider's payoff (temptation),  $c$  = payoff for mutual cooperation,  $d$  = payoff for mutual defection, and  $s$  = sucker's payoff, the standard prisoner's dilemma is defined by the twin criteria  $t > c > d > s$ , and  $(2c) > (t + s) > (2d)$ . Framed in terms of exchange relationships we can say that mutual cooperation happens when both parties give full measure in the exchange—or contribute full measure to some joint project—producing a modest net gain (over the cost of their contribution) for both. Free riding happens when one party gives full measure but the other does not, producing a substantial gain for the free rider (the other's contribution) but loss for the sucker. Finally, neither party contributing means that neither gains or, in a different version, that both take some loss from their involvement with each other.

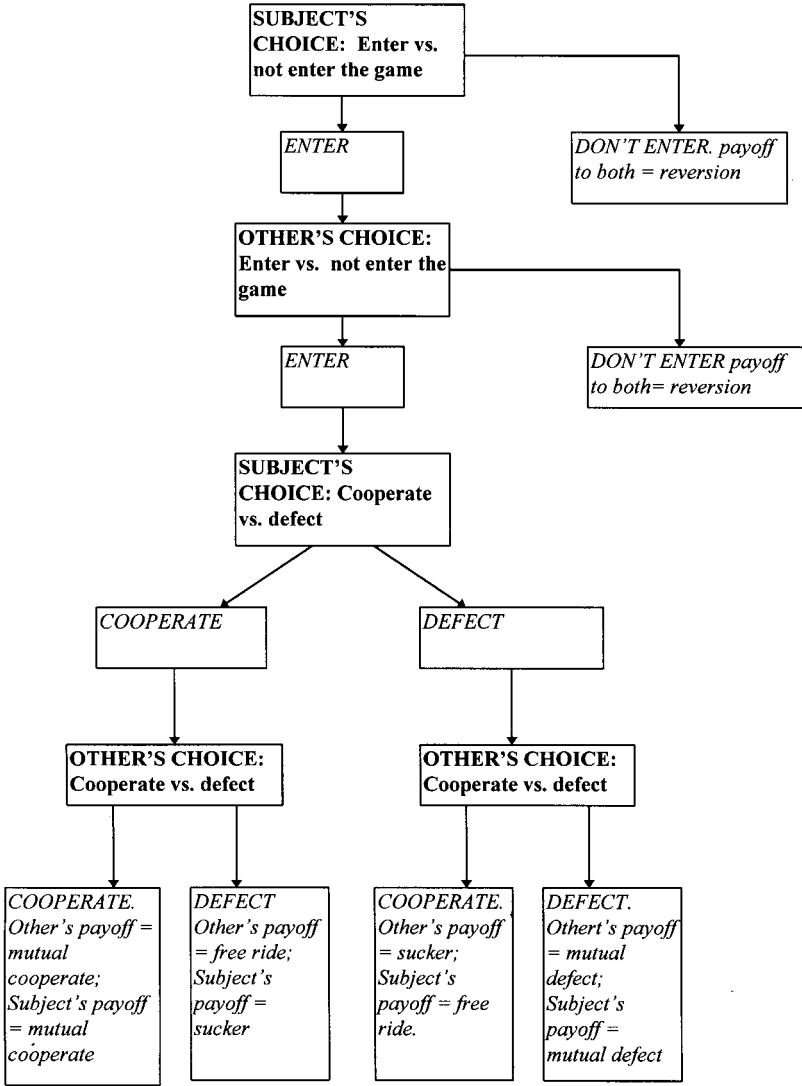


FIG. 1.—Game choices

(1) Subject's willingness to enter play with Other; (2) Other's willingness to enter play with Subject; (3) Subject's willingness to cooperate with Other—if play is consummated as a result of both being willing to enter; and (4) Other's willingness to cooperate with Subject—again, if play is consummated. For example, if Other were perceived to lack attribute X and if that lack were (for some reason) to prompt Subject into both “play” and “defect” choices while, at the same time, prompting Other into play and cooperate choices, then Other would take the lowest (sucker's) payoff while Subject would take the highest payoff (free riding). There are many other possibilities by which perceived possession or nonpossession of a given attribute could influence returns going to the respective individuals—including the game being vetoed as a result of either being unwilling to enter play. (Of course, payoffs would be random with respect to that attribute if it had no effect on any of those choices.) The empirical issue is whether perceived personal attributes of encountering individuals—physical attractiveness, in the case we examine—influence *either* of these two decisions by *either or both* of two parties encountering each other.

In these terms, various literatures suggest two broad ways by which physical attractiveness might play a role in deciding “who gets what” in an ecology of opportunities for playing such games.

#### Physical Attractiveness as an Indicator of Behavior

*High physical attractiveness as an attribute of an individual being considered as a partner in an ecology of opportunities might be used as diagnostic of responsible, cooperative behavior from that individual.* Many studies (e.g., Jackson, Hunter, and Hodge 1995; Webster and Driskell 1983) propose that the inference of special ability intervenes between attractiveness and various attributions about target individuals, but there is no obvious basis for expecting a relationship between ability and cooperation. Attractiveness might lead to the attribution of high ability, but high ability persons might just as well be expected to defect as to cooperate in prisoner's dilemma games.

More plausibly, inferences about cheating versus honest or cooperative behavior might operate as an intervening mechanism here. “Cheating” is, of course, an ubiquitous problem in exchange relationships (Axelrod 1984; Cosmides 1989; Trivers 1971) and, as Frank (1988) has argued, “scrutiny” of potential partners will often be justified, even if it comes at some cost. Not just ability, but a wide range of positive attributions are made about attractive people (e.g., Webster and Driskell 1983, p. 142; Bull and Rumsey 1988; Jackson 1992; Landy and Sigall 1974; Dion 1972; Lewis and Bierly 1990; McArthur 1982; Dion, Berscheid, and Walster 1972; Umberson and Hughes 1987; Zebrowitz, Voinescu, and Collins 1996). In his

metaanalysis of literature dealing with attractiveness, Feingold (1992) summarizes: "Socially desirable characteristics were more often ascribed to attractive students than to unattractive students, implying a 'beautiful-is-good' halo effect of attractiveness."<sup>3</sup> Perhaps the attribution of cooperativeness is just one more such attribution in an already lengthy list.

Status characteristics theory (e.g., Berger et al. 1977; Wagner and Berger 1997) provides a coherent framework supporting the same general possibility. That theory proposes that expectations about others are organized in relatively stable structures and that, as a consequence, there will be a high correlation among expectations across diverse domains. Models of power and status, for example, say Wagner and Berger, "capture in a rigorous manner the key idea that observable power and prestige behaviors are determined by an underlying structure and that inferences about the unobservable states in the structure are made on the basis of the behaviors which lead to their formation and which also are determined by them" (1997, p. 26). In such terms, therefore, physical attractiveness (one desirable attribute) might be a "diffuse status characteristic" that generalizes to the expectation of cooperative behavior (a second desirable attribute) regardless of the particular context in which the issue of cooperation arises.<sup>4</sup>

### Physical Attractiveness as an Aesthetic Preference

*Alternatively, physical attractiveness might be valued as an attribute of a potential partner in itself—might be a "taste" that is indulged independent of whatever pattern of behavior is expected from that individual.* In exchange theory's terms, simply interacting with a physically attractive person might be seen as a benefit, perhaps substantial enough to offset any costs anticipated from the interaction. Just such a taste is invoked by economists Hamermesh and Biddle (1994; see also Biddle and Hamermesh 1996) to explain the considerable "premium to beauty" to both sexes that they identify in the labor market.<sup>5</sup> These authors consider hypotheses pro-

<sup>3</sup> Feingold (1992) cites Dion et al. (1972) and Miller (1970) in support of this conclusion. Although little of the literature on physical attractiveness is concerned explicitly with exchange relationships (an exception is Kenrick et al. [1993]), the idea that physical attractiveness is often taken to predict performance attributes is frequent in that literature (see, e.g., Mueller and Mazur [1996] on facial dominance and achievement in the military).

<sup>4</sup> In a similar vein, see Berger, Cohen, and Zelditch (1972), Berger et al. (1977), Berger and Zelditch (1985), Jackson et al. (1995), Umberson and Hughes (1987), Webster and Driskell (1983).

<sup>5</sup> Similar findings have been produced by Hatfield and Sprecher (1986), Lillard (1995), Quinn (1978), and Roszell et al. (1989).

posing (1) the sorting of more beautiful people into professions that require beauty as a job qualification and that happen, also, to pay particularly well; (2) the greater probability of more beautiful people entering the job market in the first place; (3) the enhancing effect of beauty on self-esteem which, in turn, facilitates personally rewarding exchanges with employers and customers; and (4) the possibility (relevant for women, at least) that beauty increases the probability of upward economic mobility via the marriage market. They report evidence consistent with each of these processes, but in each case the basic effect remains when these variables were controlled. In the context of such null results, they conclude that the effects they observe come from “pure Becker-type discrimination” based on beauty and stemming from employer and presumably customer tastes (1994, p. 1193).<sup>6</sup>

Notice that the “beauty as diagnostic” and “beauty as taste” hypotheses both predict a preference for *entering* prisoner’s dilemma games with more attractive individuals. This could work to the benefit of attractive individuals by providing them with more opportunities for profitable exchange relationships. In strict game theoretic terms, however, neither hypothesis predicts a willingness to cooperate with more attractive individuals once a game has been consummated. Defection remains, by definition, a dominant incentive in the prisoner’s dilemma, regardless of a partner’s attractiveness.

Just why physical attractiveness in others might have a cooperative “halo” attached or be such a widespread “taste” is sometimes explained in terms of cultural learning. Wolf (1991), for example, has proposed that the societal value placed on physical attractiveness reflects a peculiarly Western “culture of beauty,” fueled by the capacity of the media to surround us with images of flawless (particularly female) beauty. Within these terms, a preference for more attractive partners in “everyday exchange” would be a straightforward consequence of what we have been taught to value.

Evolutionary psychology provides an alternative perspective. Authors

<sup>6</sup> The economist Armen Alchian (1958) pointed out that there are financial incentives against employers discriminating on the basis of attributes of potential employees that are not related to their performance, but under a more inclusive accounting, having a taste for such attributes could make any associated financial loss rational, nevertheless. (They pay a cost for their tastes in terms of lost profits, but they gain in terms of having employees with attributes that they value more than that cost.) Relevant to this, Hamermesh and his coauthors (Bosman, Pfann, and Hamermesh 1996) have reported—at least for advertising firms in the Netherlands—that a firm’s “beauty capital” can enhance its market position (more than compensating for the higher wages provided to its beautiful employees), providing a firm basis in economic rationality for “discriminating” in favor of beauty in hiring decisions.

in this developing paradigm (e.g., Buss 1992, 1994*a*, 1994*b*; Buss and Malamuth 1996; Ellis 1992; Ridley 1993; Cosmides and Tooby 1987, 1992; Daly and Wilson 1988; Symons 1979; Trivers 1972) argue that a positive response to physical attractiveness might be an evolved product from our ancestral past. In particular, it is proposed, sexual selection has produced cognitive programs that are positively responsive now to attributes of potential partners that would have, in the past, maximized the individual's offspring through successive generations. For both sexes, health was a critical such attribute and, by hypothesis, we have evolved to respond positively to individuals possessing that attribute—as indexed, for example, by clear skin, shiny hair, and healthy, strong, and symmetrical bodies.<sup>7</sup> Notice, however, that this framework is concerned with beauty as a criterion for mate selection and that an evolved taste for beauty must generalize in two ways if it is to bear on our present concern with everyday exchange as we define it: (1) It must be triggered in situations that have—can have—no bearing on mate selection, however broadly or narrowly defined, and (2) it must apply to exchange encounters among members of the same sex. Yet such a generalization might readily be accommodated by proposing that a “switch” for turning off such a response in all but sexual encounters would have involved more fitness costs than gains and thus would not have evolved.

Notice that gender differences are central to both of these arguments about the origin of our responses to beauty, and gender will play a prominent part in our analysis. Note also that, while these arguments are both sufficient to explain any halo effect or taste for attractiveness that might exist, our concern is not to explain such mechanisms, but to understand their possible role in the choices people make within ecologies of opportunities for everyday exchange relationships.

## RESEARCH DESIGN

The standard methodology in psychological and sociological studies of attractiveness (Morse et al. 1974) is to present subjects with photos of

<sup>7</sup> The specifics of what is experienced as attractive are said to be somewhat different for males and females. Granted females' relatively short period of reproductive potential, *youth* is proposed as a particularly attractive attribute of females for males, while control over resources and a willingness to share those resources with a mate during vulnerable periods of pregnancy and early child care are proposed as particularly attractive attributes of males for females. While this paradigm leaves plenty of room for variation between cultures in the specifics of what is recognized as attractive in either sex, it does suggest that there are some broad constraints on culture in this respect (for a review from the perspective of evolutionary psychology, see Cunningham, Druen, and Barbee [1997]).



individuals who have been ranked as more or less attractive by a panel of judges and to record subjects' attributions and tastes with respect to the individuals so portrayed—with the implication that those responses bear on how more and less attractive individuals fare in natural circumstances. Yet, as the exchange paradigm sketched above shows, how individuals fare does not depend only on the tastes or attributions that subjects might have about other individuals. Outcomes also depend on how the other individuals themselves respond, meaning that outcomes are a function of play-versus-not-play and cooperate-versus-defect choices of both parties to a possible exchange, with both individuals being simultaneously both Subject *and* Other. It is thus quite possible that the effect of attractiveness-based tastes and attributions is defused—or perhaps multiplied—when “fed through” the decision structure set out in figure 1.

In response, we adopt a four-part laboratory paradigm. Our paradigm allows us to

1. *Observe financially consequential choices by pairs of subjects, each of whom is contemplating a risky but potentially profitable exchange relationship with the other.* While values other than money clearly are at stake in natural circumstances, working with dollars in the laboratory has the twin advantages of letting us define prisoner's dilemma payoffs in precise terms and letting us measure individuals' payoffs as a result of their encounters—thus differences among payoffs that might be attributed to their physical attractiveness.

2. *Measure the physical attractiveness of each individual in the eye of the other, as well as in his or her own eyes.* Thus, we observe subjects' “attractiveness assessments” of *real* people with whom they must make *real* (and risky) decisions. No panel of judges assesses the attractiveness of subjects in our experiment, but each subject makes his or her own assessment of each other individual—as well as of his or her own attractiveness.

3. *Relate those assessments to quantitative data about relative (dollar) payoffs in such transactions.* This is, of course, what must be done to identify a “premium to beauty” among our subjects. The laboratory transactions we observe might not be “natural world” transactions but they are, nevertheless, quite real in dollar terms.

4. *Trace the pattern of choices that is responsible for whatever beauty-based payoff differences do occur.* Our data are at the individual level—also, as we will show, at the level of individual *decisions*—meaning that we can examine attractiveness-related choices as they happen among pairs of particular individuals when each is, simultaneously, both “subject” (making a choice) and “other” (the target of choice).

Subjects were recruited by advertisement in the University of Oregon student newspaper and in the *Eugene Register Guard*. The advertisement

invited participation in two studies related only in the manner of payment. Subjects would be paid \$20 for their participation in the first study (which took about an hour) and that sum would be their “starting money” for the second study; in that second study, they might make as much as \$20 more or, perhaps, lose the entire \$20 as a result of their decisions and the simultaneous decisions of others. They were guaranteed at least \$5 for their time, regardless of what happened in the second experiment. The majority of subjects (83%) were students—somewhat skewed toward more senior undergraduates—and the remainder were townspeople, in many cases jobless or even homeless persons. Women made up 58% percent of the participants. Seven subjects were seated randomly around a large room with each chair being clearly marked by a letter between *A* and *G*. An experimenter sat at a further seat and read standardized instructions. No communication among subjects was permitted, but subjects could direct questions to the experimenter in the presence of others. The experimenter emphasized (1) that the study involved no deception, (2) that all decision making would be strictly anonymous with no subject knowing (during the experiment or thereafter) how others had chosen, (3) that it was important for everyone to understand exactly what was involved—and that he would, accordingly, respond fully to any questions. These assurances were, of course, kept. Subjects were then introduced to a generalized prisoner’s dilemma matrix and led through its choices. A brief quiz was given and problems of understanding revealed by the quiz were fully explained.

In 16 of the 32 replications, the alternatives presented to subjects included, in addition to the standard cooperate-versus-defect alternative, the play-versus-not-play alternative with particular other individuals. In that condition subjects chose to play in 59% of their decisions and thus also made the cooperate-versus-defect choice. In the other 16 replications, subjects were given only the cooperate-versus-defect choice in each case; they were “locked into” prisoner’s dilemma play as in conventional designs. We have grouped the “play” decisions (thus also cooperate-vs.-defect choices) in the former or “trinary” condition with all decisions in the latter or “binary” one for analysis of the cooperate-versus-defect choices. Subjects chose to cooperate in 37% of their decisions.

Actual decision making then proceeded. Each subject made two decisions on each of three different matrices (specified in the appendix) with pairs of subjects playing with each other on the same matrix. While subjects made each in their sequence of six decisions at the same time, pairs of individuals did not make their decisions with respect to each other at the same time (see table A1 in the appendix). Each subject knew that each of the other six subjects would, at some point in the sequence, be making a decision with respect to himself or herself, but did not know when that

particular decision was being made. Complementing our strict anonymity requirements, this pattern prevented explicit or tacit communication among subjects, thus eliminating any potential there might otherwise have been for using actual choices in the experiment as a basis for developing relationships beyond the laboratory.

On the same form that subjects used to record their decisions with respect to prospective partners, they also recorded expectations about how such prospective partners would choose with respect to them, with "0" reflecting total certainty that the given individual would defect and "100" reflecting total certainty that he or she would cooperate. Subjects recorded these expectations and made their decisions with respect to the other before the experimenter led them to the next decision in the sequence. Subjects' expectations of others' cooperation ranged over the entire scale, but the average expectation was neither optimistic nor pessimistic, falling exactly at the midpoint.

After all decision making was over and payoffs were being figured, subjects completed a final questionnaire in which they were asked, among other things, to rank the other six subjects and themselves on an 11-point scale of "physical attractiveness" (11 = "very attractive"; 1 = "not attractive at all"). The wording of the question was: "Now we would like you to rank how physically attractive you judge each of the other people in the experiment today." Just what constituted "physical attractiveness" was, thus, left to the subject to decide, and we made no attempt to investigate the particular criteria they used.

Although many subjects appeared to find this request one of the most interesting parts of the experiment, 22 refused to assign ratings to themselves and an additional 17 gave all others the same rating. The decisions of these subjects were omitted from the analysis, resulting in a total of 185 subjects.<sup>8</sup> Both self-ratings and ratings of others varied along the entire spectrum, although subjects did tend to rate themselves higher than they rated others (mean self-rating = 7.7; mean rating of others = 6.2). The final questionnaire also asked for age and gender. Although most of the subjects were college students, the age range was from 17 to 59 years old (mean age = 23.4). There were 105 female and 80 male subjects.

Decision-making forms were on clipboards held by subjects, who were told to use them in a manner that ensured privacy. Subjects were also told that, when the experiment was over, they would be dismissed from the experiment room one by one, go to a "payroom" where they would be told how much they had earned (although not what others had earned or

<sup>8</sup> Subjects omitted from the analysis did not differ from others in their gender, their pattern of choices (number of cooperate or defect choices), or the money that they earned in the experiment.

had chosen), be paid accordingly, and be dismissed. They were also told that each individual would be well clear of the experiment's general area before the next was released.

Consistent with the requirement that there should be reason for care in the play-versus-not-play decision, each of the three matrices (see the appendix) produced a loss from playing with a defector but a gain from playing with a cooperator, meaning that a subject's expectations about another's cooperate-versus-defect choice were critically important to the rationality of the play-versus-not-play choice. This prospect of loss from entering play with a defector, to have any bite, had to be *real* but—human subjects committees being what they are—we could not adopt a structure in which subjects might leave the experiment with less money than when they arrived. Our solution was to pay subjects for their participation in a prior experiment that took about 45 minutes and that, as they were told, was unrelated to the subsequent experiment except that their payment would be their “starting money” for that subsequent experiment and that they could either gain or lose money from that base. In the trinary condition, either member of a pair could veto actual prisoner's dilemma play; if play was not consummated, the reversion pay was zero (fig. 1)—neither subject lost or gained anything from their starting base from that particular encounter. Values in the three matrices (see the appendix) are such that the worst a subject could do (from being suckered on all six plays) was to lose \$26,<sup>9</sup> while the best was to gain \$22 beyond the \$20 starting money.

## FINDINGS

While our concern is with how subjects responded to what they *perceived* as “physical attractiveness” and not whether such perceptions were in any sense “reliable” or “valid,” we report the following: the coefficient alpha for attractiveness ratings assigned by others to female subjects was .69 while that for ratings assigned to male subjects was .36, consistent with there being greater agreement about what constitutes female than male attractiveness. Ratings from others had weak correlations with self-ratings, ranging from 0.00 to .23 for females (median = .14) and from  $-.26$  to .24 for males (median = .10). There was a slight, but statistically insignificant, tendency for males to give themselves higher self-ratings than did females. Both males and females tended to rate female others higher than they rated male others, and these differences were statistically

<sup>9</sup> Subjects were told that, as a payment for their time, they would be paid a minimum of \$5 whatever the dollar results of the sequence.

significant ( $t = 2.53$ ,  $df = 182$ ,  $P = .01$  for ratings given by females;  $t = 4.68$ ,  $df = 176$ ,  $P < .001$  for ratings given by males). However, all ratings for both sex groups ranged over the entire scale with similar variances, leading us to believe that gender differences in these ratings do not affect our results. These findings generally parallel what Feingold (1992) reported from his extensive metaanalysis, namely, that judges' ratings of subjects' attractiveness are moderately associated, while self-ratings and ratings by judges are less so. Feingold's (1992) recommendation, from this finding, is that self-ratings and ratings by others should be considered distinct constructs, and that is how we have proceeded.

We first examine the relationship between ratings of physical attractiveness and financial returns, then the decision patterns that result in differential attractiveness-based returns, and finally the extent to which these patterns persist once subjects' expectations of others' behavior are controlled. Our analysis of the distributional consequences of physical attractiveness is based on all encounters in both conditions, but our analysis of the decisions that produce those consequences is based on, first, the play-versus-not-play decisions in the condition (540 decisions) and, second, on the cooperate-versus-defect decisions in both conditions ( $N = 882$ ). Note that decisions on which we base our findings about process do not necessarily contain the same set as the set that produced our subjects' take-home money; a subject's choice to play in the condition, for example, might not have been reciprocated, thus would have returned that subject the reversion zero payoff quite independent of his or her own cooperate-versus-defect choice.

To analyze the relationship between attractiveness and individual decisions, we used logistic regression with decision as the dependent variable and perceived attractiveness, gender of subject, and gender of other as independent variables. We tested for interaction effects by adding variables to the initial equation in a blocked, stepwise procedure. To test the possibility that attractiveness was related to decisions differently for males and females, we added terms reflecting the interaction of subject's gender and other's gender with the two ratings of attractiveness. To examine the possibility that subjects who saw themselves as highly attractive were most likely to cooperate with others they saw as highly attractive (the interaction of self-ratings and ratings of others),<sup>10</sup> we added a dummy variable that had a score of "1" when subjects saw both themselves and the other as highly attractive (i.e., when they gave both self and other scores

<sup>10</sup> The "matching hypothesis"—which suggests that individuals tend to "pair off" with others who are similar to themselves in physical attractiveness—has, to our knowledge, only been tested in studies of dating and marital choice (e.g., Bull and Rumsey 1988; Berscheid et al. 1971; Murstein 1972; White 1980).

TABLE 1  
REGRESSION OF PAY ON RATINGS OF  
ATTRACTIVENESS (UNSTANDARDIZED COEFFICIENTS)

Independent Variable	Females	Males
Self-rating .....	.86**	-.18
Average rating by others .....	.50	.76
Intercept .....	-11.84	-5.99
<i>R</i> <sup>2</sup> .....	.07*	.02
<i>N</i> .....	105	80

\* *P* < .05.

\*\* *P* < .01.

of 9 or greater on the 11-point scale). This included 10% of the 1,110 decisions.

While each decision was reached independently and involved the subject interacting with a different person in the group, each subject did, nevertheless, contribute six decisions to the analysis, meaning that decisions are not totally independent. To correct for any bias introduced by this, we added dummy variables associated with each individual to the regression equations as a third block of variables, essentially controlling for any individual differences between subjects—in particular, for any propensity to play more often or to cooperate more often.

Occasionally we report descriptive data. Following Hamermesh and Biddle (1994, p. 1179), we grouped the measures of attractiveness for our descriptive analyses into three categories: a “low” group, including all scores that were below the midpoint of the scale (8% of the self-ratings and 35% of the ratings of others); a “medium” category, including scores 6–8 (60% of the self-ratings and 46% of the ratings of others); and a “high” category, including the top three points of the scale (32% of the self-ratings and 19% of the ratings of others).

### Physical Attractiveness and Financial Returns

We regressed both females’ and males’ total earnings across the six games on their self-ratings of attractiveness and the average ratings of attractiveness assigned to them by others. The results in the first column of table 1 indicate that females obtain significant financial benefit from attractiveness, but that these gains accrue more from their own *self*-ratings rather than from their ratings by others. On average, for each additional point females were given by others on the 11-point attractiveness scale, they earned an additional \$0.50 once self-ratings were controlled. For each

additional point that females gave themselves, they earned an additional \$0.86 regardless of how others saw them. Male subjects, on the other hand, actually lost \$0.18 for each additional point they gave themselves net of the ratings of others. While the dollar returns from others' assessments were higher for males than they were for females (\$0.76 compared to \$0.50), neither of these coefficients was statistically significant.<sup>11</sup>

In short, an "attractiveness premium" existed more for females than for males, with this premium being more highly related to females' self-assessments than to assessments made of them by others. On average, women who gave themselves ratings that were below the midpoint of our 11-point scale (scores of 1–5) earned an average of only \$4.62, while those who gave themselves ratings in the top three categories (scores 9–11) earned an average of \$9.50.

#### Decisions about and by Physically Attractive People

The regression analyses reported in table 1 used the individual as a unit of analysis, aggregating payoffs across the six encounters in which subjects participated and also aggregating attractiveness ratings by others for each subject. Yet subjects often varied substantially in how they chose across those six encounters with only one-fourth of the 185 subjects making the same decision in each interaction. In addition, as noted earlier, there was substantial variation in the ratings of attractiveness that subjects received from and assigned to the others they encountered. Accordingly, we use each subjects' individual decisions as the unit of analysis, giving a total of 1,110 such decisions (185 subjects  $\times$  6 decisions).

Table 2 shows the results of the analysis of subjects' decisions between playing and not playing with particular other individuals. The logistic regression coefficients in model 1 indicate that women were more likely to play than men and that subjects in general were more likely to play when they judged a potential partner as being attractive. Adding the interaction terms did not significantly improve the fit of this model, indicating that the influence of attractiveness was similar for male and female subjects when they were interacting with both male and female others, and that there was no tendency for subjects who saw themselves as highly attractive to only play with others they saw as similarly attractive.

Model 2 gives the results of the regression when the dummy variables representing each case were added. While adding these variables did improve the fit of the model significantly, the tendency for subjects to more

<sup>11</sup> Subjects' age had a negative effect on earnings for both males and females but did not change the patterns reflected in the tables.

TABLE 2

LOGISTIC REGRESSION OF DECISIONS TO PLAY (*N* = 552 DECISIONS)

INDEPENDENT VARIABLE	MODEL 1		MODEL 2*	
	b	<i>P</i>	b	<i>P</i>
Gender of other .....	.09	.64	-.20	.49
Gender of subject .....	-.37	.03	-5.91	.94
Subject's rating of other's attractiveness .....	.09	.01	.18	.01
Self-rating of attractiveness .....	-.02	.63	-5.84	.86
Constant .....	.08	.85	52.77	.86
$\chi^2$ † .....	12.5		365.8	
<i>df</i> .....	4		89	
<i>P</i> .....	0.1		<.0001	

\* This model includes dummy variables associated with each of the 90 subjects included in this step of the analysis. Two cases were omitted for technical reasons. Only one of the coefficients associated with these variables was significant at the .05 level, fewer than would be expected by chance.

† The  $\chi^2$  value associated with model 1 tests the null hypothesis that coefficients in that model equal zero;  $\chi^2$  in model 2 tests the improvement in fit from model 1 to model 2.

often choose to play with others they judged attractive remained significant. Descriptively, 69% of decisions were to play when the other was judged as highly attractive, but only 53% when the other was judged as low in attractiveness.

Table 3 shows the analysis of the decision between cooperating and defecting. (Any decision to opt out made by subjects in the condition resulted in that case being omitted from this analysis.) The logistic regression coefficients associated with model 1 (which does not include interaction terms) indicate that subjects were much more likely to cooperate with others they saw as attractive. Descriptively, 48% of subjects' decisions were to cooperate when the other was regarded as highly attractive, compared to only 28% when the other was regarded as low in attractiveness.<sup>12</sup>

Both the interaction between subject's gender and subject's self-rating, and the measure of mutual attraction (the dummy for high self-assessment plus high assessment of the other), were also found to influence the cooperate-versus-defect decision significantly (see model 2, table 3). Men who saw themselves as highly attractive were more likely to cooperate than

<sup>12</sup> Careful readers may note that the influence of assessments of others on financial returns (table 1) was not statistically significant, but that the influence of assessments of others on choice (tables 2 and 3) is significant. We believe that these differences reflect the different level of aggregation of the two analyses (individual vs. decision), which results in differences in sample size.



TABLE 3  
 LOGISTIC REGRESSION OF DECISIONS TO COOPERATE ( $N = 882$  DECISIONS)

INDEPENDENT VARIABLE	MODEL 1		MODEL 2		MODEL 3*	
	b	P	b	P	b	P
Gender of other .....	-.001	.99	-.04	.81	-.25	.25
Gender of subject .....	.09	.55	-2.21	.0004	-136.01	.90
Subject's rating of other .....	.11	.0004	.06	.08	.02	.64
Self-rating .....	-.03	.46	-.23	.0001	-5.29	.88
Self-rating by subject gender .....	. . .	. . .	.30	.0002	16.39	.89
Rated both self and other high .....	. . .	. . .	1.04	.0001	1.01	.02
Constant .....	-1.05	.002	.62	.19	36.96	.88
$\chi^2$ † .....	13.78		28.66		416.2	
df .....	4		2		165	
P .....	.008		<.0001		<.0001	

\* This model includes dummy variables associated with each of the 166 subjects included in this step of the analysis. Because subjects in the trinary condition had the “no play” option, each could have between one and six decisions included in this analysis. Subjects in the binary condition have six decisions included. None of the coefficients associated with the dummy variables was significant at the .05 level.  
 † The  $\chi^2$  associated with model 1 tests the hypothesis that coefficients in that model equal zero;  $\chi^2$  values associated with models 2 and 3 test the improvement in fit from models 1 and 2, respectively.

men who saw themselves as low in attractiveness (43% vs. 26%), while just the opposite occurred for women: 36% of decisions by women who saw themselves as highly attractive were to cooperate, while 51% of decisions by those who saw themselves low in attractiveness were to cooperate. (Note the marked difference between the incidence of cooperative male and females at both of these extremes.) In addition, 59% of decisions by self-rated “high attractiveness” individuals were to cooperate when they rated the other similarly “high,” while only 27% were to cooperate when they rated the other as low in attractiveness.

Notably, however, the tendency to be least cooperative toward others seen as low in attractiveness remained across all levels of self-rating. Indeed, among decisions by those who saw *themselves* as low in attractiveness, 46% were to cooperate when they saw the other as highly attractive—but only 35% when they saw the other as being in the same low category in which they placed themselves.

The third model in table 3 includes the dummy variables associated with each subject. As would be expected, the variables that are constant across subjects (subject's gender and self-rating of attractiveness) no longer have significant influences on decisions. While the effect of subject's rating of others declines markedly, the effect of mutual high ratings remains approximately the same as in the second model.

Diagnostic versus Taste Responses to Attractiveness

As discussed earlier, people might be responding to attractiveness as *diagnostic* of cooperative behavior or they might be responding to it—perhaps at some anticipated cost—simply as a *taste* that they are prepared to indulge. Subjects' expectations about others are critical in testing these two possibilities. By one extreme possibility, if subjects were responding only diagnostically, there would be a strong correlation between subjects' attractiveness assessments of others and their willingness to play (and cooperate) with such others, but there would be no correlation with expectations taken into account. At the other extreme, if subjects were responding only to their "taste for beauty" and ignoring diagnostic considerations, there would be a strong correlation between attractiveness assessments and willingness to play (and to cooperate), but none between expectations of others' cooperation and such responses.

*Others' attractiveness and expected cooperation.*—Correlations between subjects' ratings of others' attractiveness and their expectations of others' cooperation are consistent with status characteristics theory and, more generally, with there being a "halo" effect associated with attractiveness. Others who are rated as highly attractive are expected to cooperate more than those who are seen as low in attractiveness, a pattern that holds for both male and female subjects, and regardless of whether they are interacting with male or female others.

The finding extends to what subjects expect from others, given their self-assessments: subjects who rate themselves low in attractiveness had a low expectation of cooperation from others (30% or lower) in 60% of their encounters and a high expectation of cooperation (.70 or greater) in only 10%. In contrast, subjects who saw themselves as high in attractiveness had a low expectation of cooperation from others in only 24% of their encounters, and a high expectation of cooperation in almost a third. This pattern held regardless of the subject's sex, and regardless of the sex of the other whose behavior those subjects were predicting.

*Expectations and behavior.*—Table 4 shows results of the logistic regression of the decision to play-versus-not-play on each of the variables included in table 2, as well as the subject's expectation of the other's cooperation. Here, model 3 does not include the dummy variables for subjects and is directly comparable to model 1 in table 2, and model 4 in table 4 does include the dummy variables and should be compared to model 2 in table 2. Not surprisingly, subject's expectation of other's cooperate-versus-defect choice has a strong influence on subject's own behavior: subjects became more likely to choose to play if they believed that the other was going to cooperate with them.

At the same time, however, subject's assessment of other's attrac-

TABLE 4  
 LOGISTIC REGRESSION OF DECISION TO PLAY AND RATINGS OF OTHER'S  
 PROBABILITY OF COOPERATING ( $N = 540$  DECISIONS)

INDEPENDENT VARIABLE	MODEL 3		MODEL 4*	
	b	P	b	P
Gender of other .....	.15	.44	-.05	.87
Gender of subject .....	-.44	.01	-5.81	.94
Subject's rating of other's attractiveness .....	.08	.03	.15	.02
Self-rating of attractiveness .....	-.04	.42	-6.00	.85
Expectation other would cooperate .....	.01	.0001	.03	.0002
Constant .....	1.09	.04	55.80	.85
$\chi^2$ † .....	16.20		15.68	
df .....	1		1	
P .....	.0001		.0001	

\* This model includes dummy variables associated with each of the 90 subjects included in this step of the analysis. Only one of the coefficients associated with these dummy variables was significant at the .05 level.

† The  $\chi^2$  value associated with model 3 tests the change from model 1 in table 2, and the  $\chi^2$  associated with model 4 tests the change from model 3.

tiveness retained an independent and positive effect on this decision.<sup>13</sup> For example, among others estimated to be very likely to cooperate ( $P \geq .70$ ), subjects chose to play 83% of the time when they also assessed the other as high in attractiveness, but only 64% of the time when they assessed that person as low in attractiveness. Subjects chose to play 68% of the time with others they assessed as high in attractiveness, even when they estimated that such individuals were very *unlikely* to cooperate ( $P \leq .30$  or less).

Table 5 shows a comparable analysis of the decision between cooperating and defecting. Model 4 in table 5 can be directly compared to model 2 in table 3, and model 5 with model 3 in table 3. Subjects' expectations of others' cooperate-versus-defect choices had a strong effect on their own behavior: they cooperated much more often when they expected that others would cooperate with *them*. Again, however, the influence of expectations is independent of other variables in the model, for the coefficients of these variables change only slightly with the addition of the variables in models 4 and 5. Both male and female subjects more often cooperate with others they think will cooperate with them, but they also cooperate more often with others they rate as highly attractive *independent of their*

<sup>13</sup> This effect is somewhat stronger in model 4, which controls for individuals' propensity to more often play or to opt out of the games.

TABLE 5

LOGISTIC REGRESSION OF DECISION TO COOPERATE AND RATINGS OF OTHER'S PROBABILITY OF COOPERATING (N = 882 DECISIONS)

INDEPENDENT VARIABLE	MODEL 4		MODEL 5*	
	b	P	b	P
Gender of other .....	.11	.48	-.01	.97
Gender of subject .....	-2.11	.001	-137.46	.90
Subject's rating of other's attractiveness .....	.05	.16	-.01	.83
Self-rating of attractiveness .....	-.27	<.0001	-5.32	.88
Self-rating by subject gender .....	.29	.0005	16.48	.89
Rated both self and other high .....	1.16	.0001	1.20	.01
Expectation other would cooperate .....	.03	<.0001	.04	<.0001
Constant .....	2.20	<.0001	39.58	.88
$\chi^2$ † .....	78.92		61.83	
df .....	1		1	
P .....	<.0001		<.0001	

\* Model 5 includes dummy variables associated with each of the 165 subjects included in this step of the analysis. None of the coefficients associated with these dummy variables was significant at the .05 level.

† The  $\chi^2$  value associated with model 4 tests the increment from model 2 in table 3, and the  $\chi^2$  associated with model 5 tests the increment from model 3 in table 3.

*expectations about how those attractive people will behave.*<sup>14</sup> For example, among others estimated to be very likely to cooperate ( $\geq .70$ ), subjects chose to cooperate 70% of the time when they also assessed the other as high in attractiveness, but only 40% of the time when they assessed that person as low in attractiveness. Subjects chose to cooperate 36% of the time with others they estimated as being very *unlikely* to cooperate ( $P \leq .30$ ) and high in attractiveness. In contrast, they cooperated only 10% of the time when they assessed them as low in attractiveness.

SUMMARY AND DISCUSSION

As shown in figure 1, the outcome of any encounter in an “ecology of opportunities for exchange” will depend on the actions of *two* individuals—in our terms, of subjects *and* of others they encounter—and of *two* decisions that each must make. Our results show that the attribute of

<sup>14</sup> We measured subjects' estimates of the extent to which others understood the experiment using an 11-point scale similar to that we used to measure attractiveness. Adding those estimates to the logistic regression equations, however, did not alter our results.

physical attractiveness is an advantage in such an ecology, but that the pattern of choices producing that advantage is complex. That pattern does involve subjects' perceptions of others' attractiveness, consistent with findings from earlier studies. But it also involves subjects' perception of their own attractiveness, a variable whose role is different for women and men.

Following figure 1, we now reconstruct our findings in terms of the choices that individuals who encounter each other must make in such an ecology. First, subjects are more likely to enter play with others they judge as attractive, as predicted by both the attractiveness-as-diagnostic and attractiveness-as-taste hypotheses. Second, subjects are also more likely to choose to cooperate with others they judge as attractive—*not* a necessary implication of either of those hypotheses. Third, however, the decision to cooperate is *independently* influenced by subjects' own self-assessments and differently so for males and females. Males who see themselves as more attractive more often cooperate than those who see themselves as less so, while females who see themselves as more attractive *less* often cooperate than those who see themselves as less so. Correspondingly, males who judged themselves more attractive cooperate more than their female counterparts, while those who judged themselves less attractive cooperate less than their female counterparts. Fourth, there is a significant interaction between subjects' self-ratings and their rating of others such that subjects who rate themselves as attractive are particularly likely to cooperate with others they rate as attractive.

Finally, each of these effects is independent of the expectations that subjects have for the cooperation of others they encounter. Subjects do expect more cooperation from others they see as more attractive, consistent with the attractiveness-as-diagnostic hypothesis, and they do choose to play more often with such individuals. But when expectations about others' cooperation are held constant, subjects still play more and cooperate more with those they see as attractive than with those they see as *unattractive*. Attractiveness, in other words, appears to be playing *both* a diagnostic role and a taste role in these ecologies of games.

Our finding that others' perceived attractiveness predicts subjects' willingness to cooperate as well as their willingness to enter play now suggests that people who are seen as attractive are doubly advantaged. Not only do they have more opportunities for social exchange, but those opportunities are with others who are relatively inclined to *cooperate*, once the game is consummated. This does, of course, provide relatively more opportunities for them to capture the modestly profitable cooperate-cooperate payoff—but, of course, it also provides relatively more opportunities for them to capture the still more profitable free rider's payoff. Conversely, people who are seen as less attractive have relatively few opportunities for social

exchange, but those encounters that are consummated for them are relatively frequently consummated (unprofitably) with defectors. The bottom line from our data is that involvement in “everyday exchange” is generally much more profitable for those who are seen as attractive—not only because others are more willing to enter play with them, but also because others are more willing to cooperate with them should a game be consummated.

In this respect, the strong effect of self-assessments on financial returns and the opposite effect of that variable for males and females add an important further dimension to the pattern as revealed by assessments of others. In brief, the frequent willingness of females who see themselves as less attractive to cooperate exposes them to more frequent sucker’s losses than those who see themselves as more attractive. (In fact, women who rated themselves below the midpoint of our 11-point scale received that payoff in 35% of their encounters, compared with 16% of those who rated themselves at the middle or slightly higher, and 10% of those who rated themselves at the high end of the scale.)<sup>15</sup> No similar pattern appeared for their male counterparts; their frequent defection greatly reduced the incidence of sucker payoffs that they experienced.

Although both the cultural learning perspective and evolutionary perspective predicted the important role for gender that we have found, neither predicted the tendency for women who saw themselves as less attractive to cooperate so relatively often. We offer two speculations about this. One is in terms of the well-documented illusion (Quattrone and Tversky 1984) that our own behavior can have a *causal* impact on others’ behavior, even when there is no possibility of that being the case. Perhaps, that is, females who assess their attractiveness as “low” frequently cooperate in the expectation or hope that their own cooperation will promote cooperation from others—even when, as in our experiment, there is no possible way that it *could* have such an effect.

The other speculation is that, for such women, “play and cooperate” is a rational “opening gambit” when there is the prospect of a succession of plays with the same individuals, one that could be modified subsequently in the event of negative experience in the first encounter. “Nice” strategies such as this have, after all, been shown to work quite well in iterated sequences (Axelrod 1984), and it may be that “niceness” is adopted in particular by individuals who believe that they do not have many other resources with which to bargain. The fact that our experiment did not involve iterated play (and that all play was anonymous) undermines, of course, the rationality of such a response, but perhaps our data document

<sup>15</sup> The equivalent figures in the case of encounters that were actually consummated (i.e., in which both chose the “play” option) were 40%, 23%, and 15%.

a fixed or stereotyped response, one that is not considered anew on every encounter.

A further pattern that needs explanation is the fact that the women who saw themselves as attractive defected more frequently than their male counterparts. We speculate in terms of the structure of opportunities that males and females, respectively, confront in their everyday encounters. To argue from the extreme case we may say that if physical attractiveness were the *only* personal attribute valued by potential partners for females, but only one of *many* such attributes valued by potential partners for males, then the opportunity cost of *not* exploiting one's physical attractiveness to the full would be greater for females than for males. Perhaps, that is, cooperative behavior in everyday exchange is a luxury good that people are willing to "purchase" most frequently when they have many pathways to social success, with the number of such pathways being characteristically smaller for females than for males.

Alternatively, but not inconsistently, it is possible that more attractive males simply do not recognize the opportunity that their looks give them as frequently as do their female counterparts. If there is a smaller number of criteria governing responses toward females than toward males (with looks being included for both) then we might expect females to be more sensitive or responsive in their own behavior toward appearance.

Our findings suggest a shortcoming of the standard methodology of using photos of individuals assessed for "beauty" by a panel of experts in combination with attributions about those individuals made by subjects observing those photos. Much of the interest that attaches to such work comes from the implied *consequences* of various attributions for Lasswell's "who gets what, when and how," but our data now show that the perceptions and responses of *both* subject and other must be considered for an accurate accounting in such terms. It is not sufficient to infer to outcomes of exchange relationships simply from data about how one of the two people who are necessarily involved sees the other.

## CONCLUSIONS

Our findings complement those of earlier authors in two ways. First, they show that a "premium to beauty" is a feature of peoples' everyday transactions as well as of their transactions with employers and customers in the labor market.<sup>16</sup>

<sup>16</sup> While the stratification literature has focused on the distributional consequences of race, class, and gender (Ferree and Hall 1996), our findings and those of Umberson and Hughes (1987) and Hamermesh and his colleagues (Hamermesh and Biddle 1994; Bosman et al. 1997) suggest that studies of "who gets what, when and how" might profit from closer attention to the distributional consequences of how a person *looks*.

It is true that perceptions of attractiveness explain only a small portion of the entire variance in take-home pay from our experiments, and that the amount gained or lost in each transaction is relatively small. Despite our interest in the variable, we do not believe that physical attractiveness explains more than a small part of the variance of success in the natural world; Hamermesh and Biddle's (1964) findings with respect to variance explained in the labor market are comparable with ours, for example. It is nevertheless also true that our results are based on only six interactions, and that each of us in the real world encounters hundreds, if not thousands, of such interactions throughout our lives. The cumulative effect of the premium attached to beauty that is demonstrated in table 1 could thus be much larger than is indicated by the value of the  $R^2$ .

Second, while the outcome may be similar in the two markets, the process by which it is produced in the "everyday market" appears to be substantially more complex than the process that produces the premium in the labor market. A positive response to attractiveness does appear to underlie the premium in both cases, but in everyday exchange we must consider not only assessments by those who are responding to others' attractiveness, but also responses *by* those who are the targets of such assessments. Further, our findings emphasize that, when studying the effects of attractiveness, it is important to take account of peoples' assessments of their *own* attractiveness, as well as assessments others make about them—and the important role that gender plays in this respect. From our data, in fact, such self-assessments are more important (at least for women) than the assessments of others in determining "who gets what" in everyday exchange.

Finally, our data support *both* hypotheses that we outlined earlier: perceived attractiveness in others appears to be a basis from which people predict cooperative behavior and—simultaneously—a taste to which people respond with "play" and "cooperate" choices. Having others see you as attractive brings opportunities for productive exchange because people often associate such perceptions with the expectation of cooperative behavior, but that effect is compounded by the fact that many people simply like interacting with others they see as attractive—even if doing so comes at some expected cost.

Our findings, of course, are based on one-time encounters among strangers in laboratory circumstances in which anonymity was assured, and attractiveness-related decisions in natural circumstances are bound to be more complex. In particular, natural-world encounters are often not one-time affairs, and iterated relationships in the natural world provide the opportunity for modifying subsequent decisions in light of experience. To the extent that we respond to a taste for beauty, we might persist in



playing and cooperating with attractive but exploitative others (up to some point, presumably), but to the extent we treat attractiveness as diagnostic of cooperative behavior from such others, we are likely to respond with avoidance after experience shows that we are mistaken.

There is, however, a notable asymmetry here. While entering a relationship with an attractive person can provide the basis for refusing play with that person in subsequent encounters, not entering one with an unattractive person provides no equivalent basis for discovering that entering play with that person would have been justified. Our willingness to enter play with people we find attractive, in other words, does provide a basis in experience for finding that beauty is only skin deep (when that is true), but our *unwillingness* to play with people we find *unattractive* does not provide an equivalent basis for finding that *plainness* is only skin deep (when *that* is true).

APPENDIX

Each subject made two choices across each of the following three prisoner’s dilemma matrices, with all six choices being with a different individual:

Matrix 1:  $cc = 2,2$ ;  $cd = -7,5$ ;  $dc = 5,-7$ ;  $dd = -4,-4$ .

Matrix 2:  $cc = 1,1$ ;  $cd = -4,4$ ;  $dc = 4,-4$ ;  $dd = -1,-1$ .

Matrix 3:  $cc = 1,1$ ;  $cd = -2,2$ ;  $dc = 2,-2$ ;  $dd = -1,-1$ .

With  $X(x)$  indicating play with subject  $X$  on matrix  $x$  for a specified play in the six-game sequence, the sequence of plays is shown in table A1.

TABLE A1  
SEQUENCE OF PLAYS

	PLAY					
	1	2	3	4	5	6
A plays with .....	B(1)	C(2)	D(3)	E(1)	G(2)	F(3)
B plays with .....	G(2)	F(3)	E(1)	D(2)	C(3)	A(1)
C plays with .....	D(1)	B(3)	F(2)	G(1)	A(2)	E(3)
D plays with .....	F(1)	G(3)	B(2)	A(3)	E(2)	C(1)
E plays with .....	A(1)	D(2)	C(3)	F(2)	G(3)	B(1)
F plays with .....	E(2)	A(3)	G(1)	B(3)	D(1)	C(2)
G plays with .....	C(1)	E(3)	A(2)	F(1)	B(2)	D(3)

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