# Incentive-Enhancing Preferences: Personality, Behavior, and Earnings

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One cares about the preferences of those with whom one interacts in part because these preferences affect not only the degree of conflict in the interaction, but also the effectiveness of the incentives that one may deploy to induce others to act in ways advantageous to oneself. The desire to interact with others whose preferences are favorable to the strategic pursuit of one's own objectives is an important aspect of social interactions, one that for the most part has been neglected by economists.

Concerns with the preferences of others are both ubiquitous and rational, involving the choice of a business associate, a neighbor, a spouse, a teacher or care-giver for one's children, or an employee. To fix ideas, we consider here a single concrete case: the employer's concern with the preferences of his employees and the bearing this has on the determinants of individual earnings. According to the canonical model, human capital consists of capacities to contribute to production. Individuals possess a vector of capabilities c and sell these on the labor market at prices p, with wages w = pc.

There are many reasons why an employer would care about the preferences of his employees, since the employee's preferences affect the cost of securing labor services. We will study the case where there is a principal–agent relationship between employer and employee in which effort is not contractible. We term preferences that allow the employer to induce effort at lower cost *incentive-enhancing*. They are valuable to the employer, and though they are not capacities in the sense that they appear in a production function, they may nonetheless be rewarded by profit-maximizing employers facing a competitive labor market. We begin by showing how such preferences affect earnings in a standard principal–agent model and then provide evidence that one of the relevant behavioral traits, efficacy, and other psychological aspects of individuals, are significant influences on earnings.

## I. Incentive-Enhancing Preferences

Suppose that the amount of labor services an employee supplies to a firm is the product of two terms: the number of hours h worked and the employee's effort level e, where  $0 \le e \le$ 1. We assume that the employer can contract for hours h, but effort e is not verifiable and hence cannot be determined by contractual agreement. However, the employer has an imperfect measure of e that indicates with probability  $\tau(e)$  that the employee has "shirked," where  $d\tau/de < 0$ . Employees whose shirking is detected are dismissed and replaced by a new employee (identical to the one replaced). The employer as first mover chooses h and w to maximize profits, in the knowledge that a higher wage may induce the employee to supply more effort, since the cost of job loss increases with the wage. The employee then chooses effort *e* to maximize the present value of expected utility, given the employee's beliefs about the termination function  $\tau(e)$ . We call this a *contingent* renewal model of the employment relationship.

The employee's best-response function e = e(w, z) shows the level of effort *e* chosen by a employee faced with a wage rate *w* and an exogenously given fallback position *z*, defined as the expected present value of lifetime utility

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for a dismissed agent. One may think of z as depending on the availability of incomereplacing transfers such as unemployment benefits, the expected duration of a spell of unemployment, and the expected stream of utility both during unemployment and in the employee's subsequent employment.

Suppose the employee has the utility function u(w, e), which is smooth, strictly increasing, and concave in the wage w, and strictly decreasing in effort e. If the discount rate is  $\rho$ , then the present value v(e) of having the job is given by

(1) 
$$v(e) = \frac{u(w, e) - \rho z}{\rho + \tau(e)} + z.$$

The first term on the right-hand side of (1) is the per-period net returns  $u(w, e) - \rho z$ , converted to an asset value using the discount rate  $\rho$  plus the probability of dismissal  $\tau(e)$ . This equation thus has a simple interpretation: the value v of the job equals the value z of the fallback plus the employee's *job rent*, namely, the excess of the present value of the job over the next best alternative. The employee then chooses effort e to maximize v(e). The employee's first-order condition  $v_e = 0$  can be written as

(2) 
$$\frac{\partial u}{\partial e} = (v - z) \frac{d\tau}{de}$$

That is, the marginal subjective cost of effort must equal the marginal subjective benefit, namely, the job rent times the marginal effect of increased effort on the probability of keeping the job. Equation (2) defines the employee's best-response function e(w, z).

We say a parameter b in the employee's utility function is incentive-enhancing if an increase in b shifts the employee's best-response function upward, an increase in incentive-enhancing preferences leading an employee to work harder at every wage rate, holding all else constant. This being the case, if otherwise identical individuals employed by a firm have differing levels of some incentive-enhancing preference b, and employers can determine the worker's type, the one with the higher level of b (the "good worker") will be paid more in competitive equilibrium than the "bad worker." Were this not the case the employer would not hire the "bad worker."

Here are two examples of incentive-enhancing preferences. First, it is easy to see that a reduction in the individual's rate of time preference (i.e., a greater orientation toward the future) is an incentive-enhancing preference as it raises the subjective value of retaining the job in the future and thus of avoiding any behavior that might result in termination. This may be confirmed by differentiating (2) with respect to  $\rho$ , using (1): a lower  $\rho$  results in a larger job rent for a given wage.

Second, individuals differ greatly in the strength of their sense of personal efficacy, a personality trait frequently measured (inversely) by the Rotter "locus of control" scale. Highly fatalistic, low-efficacy persons believe that their actions have little impact on the outcomes they experience. We thus rewrite the employee's belief concerning the termination probability as  $\tau(e, f)$ where f is the Rotter measure of fatalism, so that more fatalistic people believe that their work effort has less effect on the probability that their job will be terminated. Because greater fatalism lowers the absolute value of  $\partial \tau / \partial e$ , it lowers the marginal subjective benefit to exerting effort and so reduces the employee's desired effort level. Thus, fatalism is an incentive-depressing trait (efficacy is incentive-enhancing).

Other incentive-enhancing preferences include a sense of shame at being without a job and a distaste for receiving "handouts," both of which reduce *z*, raising the marginal subjective benefit of effort. The above reasoning shows that these and other incentive-enhancing preferences may earn a competitive reward by a profit-maximizing employer. We turn now to consider empirical evidence on skills and incentive-enhancing preferences as determinants of earnings.

#### **II. Empirical Evidence**

Early research by Christopher Jencks (1979) found personality and behavioral traits such as industriousness, perseverance, and leadership to have statistically significant influences on measures of labor-market success, controlling for standard human-capital variables. The estimated effects of these behavioral and personality variables, suitably normalized, were comparable in size to the estimated effects of schooling, IQ, and parental socioeconomic status. But until recently (Greg J. Duncan and

Rachel Dunifon, 1997; James Heckman, 2000; Bowles et al., 2001), few studies have sought to replicate or extend his work. Two empirical challenges have impeded econometric work in this area. The first is that conventional economic theory provides little guidance in terms of which personality or behavioral traits may influence earnings, and there is little reason to expect that any given trait will have the same effect across different jobs. The sociological theory of social exchange initiated by Peter Blau (1964) provides somewhat more, but still quite inadequate, guidance. Second, whatever traits makeup the *b* vector of incentive-enhancing preferences or other behavioral and personality determinants of earnings, it is quite likely that they are endogenous, that is, both causes and a consequences of labor-market success.

One recent study (Osborne, 2000) addresses these concerns using the (U.S.) National Longitudinal Survey of Young Women (NLSYW) and the (U.K.) National Child Development Survey (NCDS). Both are panel data sets that include personality and behavioral measures prior to labor-market experience, as well as subsequent earnings. The NLSYW collects measures of fatalism at various ages using the Rotter scale. From the NCDS, two orthogonal personality variables are extracted, termed "Aggression" and "Withdrawal," using principal components from a 146-item and 12-syndrome inventory of social adjustment evaluated when the respondents are 11 years of age. The inventory is evaluated by an outside investigator based on lengthy observations of the child's behavior at school.

To address the endogeneity of the personality variables, Osborne developed two exogenous instruments for adult personality, thereby avoiding the overestimation of the coefficient on personality which would otherwise arise from the effects of labor-market success on the relevant personality variables. The first technique uses measures of personality prior to labor-market experience as an exogenous instrument for adult personality. The second technique creates an instrument for adult personality that is independent of wages yet highly correlated with adult personality measures. This instrument for adult personality is used with the NLSYW data only. It is formed by purging the adult Rotter score of the estimated influence of past wages. For the NLSYW data set, the two methods yield very similar results.

Osborne found that individual differences in personality account for substantial differences in earnings, and personality determinants of earnings differ by sex and position in the occupational hierarchy. Differences in measured personality traits have statistically significant influences on women's wages. Using the NLSYW data and regressing the natural logarithm of wages on years of schooling, measured IQ, work experience, number of children, and socioeconomic status of parents, the Rotter score has a negative influence on wages, with a one-standard-deviation increase in fatalism estimated to decrease wages by 6.7 percent. In the NCDS data, controlling for educational attainment, measured IQ, the number of Ordinarylevel exams completed (a measure of both school quality and individual cognitive skills) and socioeconomic status of parents, both Aggression and Withdrawal are found to have negative influences on wages. A one-standarddeviation increase in Aggression or Withdrawal is associated with a 7.6-percent or a 3.3-percent decrease in wages, respectively. All of these estimates are statistically significant at conventional levels.

Osborne (2000) also found that the influence of personality on wages differs by sex and occupation. She first truncated the NCDS data by sex and an exogenous prediction of occupational status, then partitioned the respondents into four classes: men and women whose parental background and other exogenous characteristics predict entry into highstatus and low-status jobs. She found that in high-status jobs, women confront significantly greater penalties than men for having aggressive personalities. While a one-standard-deviation increase in aggression is associated with a 7.2-percent *penalty* for women's wages in high-status occupations, the equivalent increase in aggression is associated with a 14.5-percent *increase* in men's wages within identical occupations (see Table 1). This pattern is reversed for withdrawal: women in highstatus occupations are rewarded for withdrawal, while men are heavily penalized. Across social strata, differences in the returns to personality also exist. For example, we find that, for men, aggression is highly rewarded in high-status

Sex	Predicted job			
	High status		Low status	
	А	W	А	W
Women Men	-0.072 + 0.145	$+0.060 \\ -0.167$	$-0.052 \\ -0.090$	$-0.056 \\ -0.149$

TABLE 1—RETURNS TO DISTINCT PERSONALITY FACTORS (A AND W), BY SEX AND PREDICTED OCCUPATIONAL STATUS

*Notes:* Entries are the percentage changes in wages associated with a one-standard-deviation difference in the independent variable. A = Aggression; W = Withdrawal. All estimates are statistically significant at the 5-percent level, except in the case of women and low-status jobs.

Source: Osborne (2000), using the NCDS sample described in the text.

occupations and strongly penalized in lowstatus occupations.

## **III.** Conclusion

While the study of behavioral and personality traits as earnings determinants is in its infancy, we think enough is known to support four conclusions. First, measures of cognitive performance are not sufficient indicators of the effectiveness of schools in promoting student labor-market success. We need broader indicators of school success, including measures based on the contribution of schooling to the behavioral and personality traits that we have termed incentive-enhancing preferences.

Second, incentive-enhancing preferences are irreducibly heterogeneous. We are not likely to find a noncognitive behavioral or personality analogue to the common factor g underlying most measures of cognitive performance. If the importance of incentive-enhancing preferences arises from the behavioral demands of the job, traits that count in some jobs might not count in others. Self-direction may contribute to the earnings of someone fairly high up in the chain of command, for instance, while penalizing someone at the bottom. Similarly, traits may count differently for men and women, or for different ethnic or language groups.

Third, the fact that labor-market success may contribute to the development of incentiveenhancing preferences reinforces the likelihood that poverty may persist over generations within families. A low sense of efficacy may contribute to low earnings, which then reinforces a low sense of efficacy. Labor-market research along these lines might both illuminate and benefit from the well-established literature on cultural poverty traps in sociology.

Finally, while improving earnings-enhancing cognitive skills is probably welfare-increasing for students and is thus an uncontroversial objective of schooling, the same cannot be said of all incentive-enhancing preferences. Many will balk at the idea that schools should inculcate the beliefs that it is shameful to be without a job, or to receive unemployment insurance benefits-both of which, as we have seen, count as incentive-enhancing preferences. The same caution applies to fostering traits such as Aggression in high-status males or the psychological dimension termed "Machiavellianism" (measured by the extent of agreement with statements from Nicolo Machiavelli's The Prince), which has been shown to increase earnings but which many would consider a character flaw.

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