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Stigler–Becker versus Myers–Briggs: why preference-based explanations are scientifically meaningful and empirically important

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Abstract

Economists typically object to preference-based explanations of human behavior; differences in preferences "explain everything and therefore nothing". But this argument is only correct assuming that no empirical evidence exists to discipline preference-based explanations. In fact, over the past decade, personality psychologists have produced a robust collection of stylized facts about human preferences. While preferences are, empirically, quite *stable*, they are far from *identical* and have proven predictive power for economically interesting variables. The empirical challenge for future research is to *jointly* estimate the impact of preferences and constraints to obtain unbiased measures of their relative importance.

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> ...[O]ne does not argue over tastes for the same reason one does not argue over the Rocky Mountains—both are there, will be there the next year, too, and are the same to all men.
>
> George Stigler and Gary Becker, "De Gustibus Non Est Disputandum" (Stigler and Becker, 1977, p. 76)

1. Introduction

Economists have long harbored the suspicion that using preferences to explain behavior is tautologous. But Stigler and Becker's classic "De Gustibus Non Est Disputandum" (1977)

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may have been the critical factor that transformed a diffuse suspicion into a professional consensus. As they put it, "no significant behavior has been illuminated by assumptions of differences in tastes" (1977, p. 89). In making this argument, Stigler and Becker sharply redrew disciplinary boundaries; rather than leaving the study of tastes to other disciplines, they essentially concluded that there was nothing to study.[1]

When they wrote, Stigler and Becker may well have been correct to assert that "no other approach of remotely comparable generality and power is available"[2] (1977, p. 77). But since then, empirical work in personality psychology has been extremely fruitful, reaching a solid consensus on a wide range of topics (Hogan et al., 1997; Piedmont, 1998; McCrae and Costa, 1997a). Personality psychologists do not put it in these terms, but in economic language, they now possess a scientifically credible "theory of preferences".

The purpose of the current paper is to explore the implications of modern personality psychology for economics. At the most fundamental level, this body of empirical research seriously undermines the notion that "preferences explain everything and therefore nothing". This would only hold if *nothing empirical were known* about preferences. In contrast, preference-based explanations cease to be a scientific "blank check" once they are constrained by a detailed body of empirical findings about human personality. On a more applied level, the overall findings in personality psychology suggest that Stigler and Becker's view of preferences is half-right and half-wrong. Empirically, there is fairly strong support for the view that preferences are *stable*; personality changes are rare, especially after the age of 30 (McCrae and Costa, 1990). However, the view that preferences are *identical* is very difficult to empirically defend. Rather, personalities differ widely along a handful of basic dimensions (Piedmont, 1998; Costa and McCrae, 1995; Johnson, 1997). In fact, much "pathological" behavior that non-economists cite as evidence against the economic approach is easy to reinterpret as standard behavior by actors from extreme tails of the personality distribution (Costa and Widiger, 1994; Costa and McCrae, 1992).

The paper is organized as follows. Section 2 argues that empirical evidence from personality psychology provides a strong answer to the "argument from tautology" against preference-based explanations. Section 3 shows that part—but not all—of economists' familiar analytical approach can be preserved; empirically, personality is indeed rather stable, even though it is far from homogenous. Section 4 discusses a sample of applied topics in economics that personality psychology can illuminate, from wages and signaling to insurance and addiction Section 5 concludes the paper.

2. The explanatory power of preferences

In pure economic theory, consumer choice is always the joint product of preferences and the budget constraint (Hildenbrand and Kirman, 1988). But *applications* of the basic choice model typically treat preferences as fixed, leaving the budget constraint to bear the full burden of explaining variation in behavior. Why? The standard answer, which Stigler

[1] For another, quite different critique of Stigler and Becker's position, see Cowen (1989).

[2] As recently as 1996, however, Becker still remarked that "I do not believe that any alternative approach—be it founded on 'cultural', 'biological', and 'psychological' forces—comes close to providing comparable insights and explanatory power" (1996, p. 4).

and Becker helped crystallize, is that preference-based explanations cannot be empirically tested. As Stigler and Becker dismissively put it, tastes provide "endless degrees of freedom" (1977, p. 89). Explanations that invoke budget constraints, in contrast, are empirically testable, though they admit that nailing down the "subtle forms that prices and incomes take" (1977, p. 76) is often challenging.

The implication seems to be that taste-based explanations would be methodologically acceptable if they were somehow allocated a finite—and preferably small—number of degrees of freedom. But how could this be done? The natural answer is "Empirical study of preferences". After all, budget constraints too might be accused of providing "endless degrees of freedom"—until we empirically measure the relevant market prices and incomes of market participants. These observations then discipline subsequent analysis. Why then cannot the same route—empirical measurement of basic parameters—be pursued in order to discipline preference-based explanations?

At the time of their writing, Stigler and Becker might well have granted the methodological soundness of this route, but still characterized it as a practical dead-end. In spite of intensive study of preferences within psychology, sociology and other disciplines, they might have argued, little had been discovered. Today, however, it would be difficult for them to maintain this stance. A great deal about the structure of human personality is now well-understood. Factor analysis on personality questionnaires—administered on a large scale to diverse populations around the world—typically recovers approximately same five highly reliable factors (Section 3) (Hogan et al., 1997; Costa and McCrae, 1995; McCrae and Costa, 1997b; Piedmont, 1998).

Efforts to falsify these findings have frequently added to the weight of evidence in their favor. Five factors emerge even when researchers take a highly agnostic approach ex ante by, for instance, sampling over all humanly-applicable adjectives in the dictionary (Piedmont, 1998, pp. 20–32). Inter-subjective personality judgments almost always positively correlate, with the strength of the correlation rising with degree of familiarity: Self-spouse judgmental correlations exceed self-friend correlations, which in turn exceed self-acquaintance correlations. Even extremely brief and superficial contact leads to personality assessments measurably superior to random guessing[3] (Funder and Colvin, 1997; Robins and John, 1997; Funder and Sneed, 1993; McCrae and Costa, 1987; Borkenau and Liebler, 1993). Behavioral genetic studies of personality normally find moderate (40–60 percent) heritabilities for the five personality factors, showing that personality traits have a biological basis (Bergeman et al., 1993; Blum and Noble, 1997; Bouchard and Hur, 1998; Bouchard and McGue, 1990; Jang et al., 1996). Finally, personality traits are useful predictors of an array of non-personality traits (Barrick and Mount, 1991; Costa, 1996; Briggs Myers and McCaulley, 1985; Boone et al., 1999; Meyer, 1992).

This empirical literature suggests a new direction for the economic approach to human behavior. Rather than dismissing preference-based explanations with their "endless degrees

[3] Given the attention economists have recently been paying to the cognitive anomalies literature (Rabin, 1998), it is worth noting that personality psychologists have actually empirically pursued many of economists' reservations. For example, in "ecologically-valid" settings that people deal with in real life—such as assessing each other's personalities—the typical person's judgement is indeed much more accurate than in contrived experimental settings (Funder, 1995; Funder and Colvin, 1997; Funder and Sneed, 1993).

of freedom", we can empirically operationalize preferences as a short list of major "personality traits".[4] In this way, preferences and constraints can be put on the same footing: until they have been empirically operationalized, both provide uninteresting tautologous explanations of human behavior. But in both cases, empirical operationalization is feasible: constraints using data on income and prices, preferences using data on personality.

Before proceeding, it is worth mentioning that in Accounting for Tastes (1996), Becker's notion of "personal capital" indirectly suggests a reply to the previous critique. In this work, Becker recognizes that "past consumption and other personal experiences" affect current preferences; smoking cigarettes in the past, for example, amplifies one's taste for them in the present.[5] In a similar vein, one might for example argue that frequent interaction with others amplifies the taste for socializing. One person gets a job in sales, acquiring personal capital in dealing with clients; another works as a librarian, allowing his interpersonal skills to depreciate. The end result, Becker might maintain, would be the endogenous creation of extraverted and introverted personalities, even though tastes were ex ante identical.

This story is admittedly internally consistent. But research on the genetic and environmental contributions to personality make a pure habit-formation account of personality formation difficult to defend. As mentioned above, the big five personality traits are usually found to be moderately heritable (40–60 percent). To a fair extent, then, people would differ exogenously in temperament even if their "past consumption and personal experiences" were the identical. A second standard finding casts further doubt on the hypothesis of endogenous personality creation: specific measures of family environment explain almost none of the variance that remains after controlling for genetic similarity (Bouchard and McGue, 1990; Jang et al., 1996; Harris, 1998). Even identical twins raised together typically differ moderately in personality, but identical twins raised apart do not appear to differ *more*. In other words, at least the aspects of people's environments that can be quantified have little effect on their personality. If personality differences really reflected the gradual acquisition of "personal capital", why are such linkages so difficult to detect? Overall, then, the behavioral genetic evidence renders a pure "personal capital" account of personality problematic.

3. Preferences: heterogeneous but stable

3.1. The "big five" personality traits

Stigler and Becker hope to explain human behavior on the assumption of identical tastes. Virtually the entire field of empirical personality research runs counter to this assumption,

[4] As an anonymous referee points out, there is no need to rule out the possibility of additional, non-personality aspects of preferences, especially socialization. But personality traits are probably now better understood and more empirically tractable. Furthermore, Becker's model of personal capital (discussed below) arguably provides an adequate account of socialization within the confines of the basic Stigler–Becker approach.

[5] While Becker (1996) modifies his terminology to allow for "changes in preferences", he is careful to specify that he is only referring to subutility functions, which shift in response to changes in "personal" and "social" capital. He retains the assumption that the underlying utility function is stable and identical between persons.

however. This literature finds that individuals' personalities vary widely; one person's benefits are frequently another's costs. Personal interaction, structured work, novelty—all are highly prized by some segments of the population, but actively avoided by others. Thus, even when they have the same income and face the same prices, individuals' behavior will vary in predictable ways. A fortiori, when groups differ in average personalities, groups will act differently even when their constraints are identical.[6]

Enumerating thousands of ways that individuals vary is obviously not particularly helpful for empirical researchers. Much of the value-added of personality research comes from the discovery that the apparently messy universe of human traits can be reduced to a small number of basic dimensions using factor analysis (Piedmont, 1998). Eysenck's (e.g. Eaves et al., 1989) earlier research along these lines concluded that personality could be reduced to three dimensions: extraversion, neuroticism, and psychoticism. Using less formal techniques, and building on Jung's speculations, Myers and Briggs argued for a four-dimensional model (Briggs Myers and Myers, 1993; Bouchard and Hur, 1998; McCrae and Costa, 1989; Carlson, 1985). Their Myers–Briggs type indicator (MBTI) continues to be the most widely-used personality assessment tool. It classifies respondents according to their location on the extraversion–introversion, sensing–intuition, thinking–feeling and judging–perceiving spectra.

Academic personality researchers, however, now generally see a strong preponderance of evidence in favor of the five factor model (FFM), typically assessed using the revised NEO personality inventory, or NEO-PI-R. According to the FFM, there are five fundamental and largely orthogonal personality dimensions, frequently referred to as the "big five". These are generally called openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism.[7] The big five factors emerge from a wide variety of data sets across gender, race, and national origin (Triadas, 1997; McCrae and Costa, 1997a), and appear to improve on competing personality models without loss of important information (Piedmont, 1998, pp. 40–46). Four of the FFM dimensions correlate highly, for example, with the four dimensions of the MBTI; but the FFM picks up a great deal of additional variance by adding the fifth dimension of Neuroticism[8] (Piedmont, 1998, pp. 43–46; McCrae and Costa, 1989).

What do the big five personality dimensions capture? The remainder of this section provides a brief survey (Piedmont, 1998, pp. 84–112). It is important to bear in mind that

[6] Explorations of the connection between personality and culture are probably still in their preliminary stages. Stereotypes suggest that culture skews the distribution of personality types. Lee et al. (1999) and Lee et al. (1995) provide suggestive empirical evidence in favor of a number of these popular perceptions. But the evidence remains relatively unsystematic. For raising this issue, I am indebted to Richard Day.

[7] The formal techniques of factor analysis naturally do nothing to impose these exact names. While their popularity is in decline, alternative labels persist. Openness has also been called "culture" and "intellect" (though the latter misleadingly suggests a high correlation with measured intelligence); conscientiousness, "socialization", "achievement via conformity", and "orientation toward work versus play"; extraversion, "surgency" and "positive emotionality"; agreeableness, "nurturance"; and the negative of neuroticism, "emotional stability" (Hogan et al., 1997).

[8] FFM extraversion and openness have approximately. 7 correlation's with MBTI extraversion and intuition, respectively; FFM agreeableness and conscientiousness have slightly less than. 5 correlation's with MBTI feeling and judging, respectively. All MBTI correlations with FFM neuroticism are much lower (McCrae and Costa, 1987, p. 30).

the following personality traits emerge empirically from factor analysis. Traits with no definitional link may still fall under a common factor as long as they frequently appear together, and vice versa. For example, cheerfulness and gregariousness load on the same factor, even though a "cheerful loner" is hardly contradictory; it simply happens to be the case that people who are more sociable are also, on average, more cheerful.

3.1.1. Openness to experience

The openness dimension captures receptivity to novel experiences and ideas (McCrae and Costa, 1997b). Individuals high in openness are frequently described as imaginative, inquisitive, artistic, and tolerant; those low in openness as practical, down-to-earth, and rigid. Aesthetic appreciation, intellectual curiosity, unconventionality, and preference for variety all characterize open individuals. At the same time, they are also more willing to entertain the validity of astrology and other pseudo-scientific beliefs. Openness is the only of the five personality traits significantly related to measured intelligence, though the correlation is fairly weak (approximately + 0.2).

3.1.2. Conscientiousness

Conscientiousness is a measure of motivation and diligence; as Piedmont puts it, "This dimension contrasts dependable, fastidious people with those who are lackadaisical and sloppy" (1998, p. 90). Those low in conscientiousness are typically seen as lazy, careless, unambitious, and spontaneous; those who score high, on the other hand, as hard-working, careful, ambitious, and cautious (Hogan and Ones, 1997). As the Section 3.1.3 discusses in depth, high conscientiousness is a consistent predictor of job performance across diverse occupations, even though it is essentially uncorrelated with measured intelligence.

3.1.3. Extraversion

Extraversion measures a cluster of traits, not just preference for personal interaction, but also activity level and cheerfulness (Watson and Clark, 1997). Again quoting Piedmont, "this domain contrasts sociable, active, person-oriented individuals with those who are reserved, sober, retiring, and quiet" (1998, p. 86). Individuals high in extraversion enjoy interacting with many different people, those low in extraversion prefer a lower level of social contact, or even solitude. Individuals low in extraversion are less willing to assert themselves, and prefer more relaxed, less busy lives.

3.1.4. Agreeableness

Agreeableness captures variation in attitudes towards other people, from compassionate and trusting on the one hand to cold and cynical on the other (Graziano and Eisenberg, 1997). It also reflects the preference for logical versus emotional cognitive approaches, with low agreeableness individuals preferring rational, critical modes of inquiry.[9] In short, "hard heads" and "hard hearts" correlate empirically; high agreeableness corresponds to soft hearts and soft heads, low agreeableness with hard hearts and hard heads.

[9] The authors of the FFM to some degree downplay the cognitive element, reducing it to only one of six agreeableness facets "tendermindedness". This cognitive element is however the central feature of the MBTI thinking–feeling dimension, which correlates highly with FFM agreeableness.

3.1.5. Neuroticism

Neuroticism indexes the propensity to experience negative emotions like anxiety, anger, and depression. Persons low in neuroticism rarely experience such feelings, while persons high in neuroticism experience them frequently. Neuroticism is also associated with hard-to-control cravings for food, drugs and other forms of consumption with immediate benefits but long-run costs (Costa and Widiger, 1994; Costa and McCrae, 1992).

3.2. Stability

Treating preferences as identical turns out to be empirically indefensible. Treating preferences as *stable*, however, is a different matter. One remarkable aspect of personality research is that it provides partial empirical support for Stigler and Becker's approach. Stigler and Becker argued that economists should, on methodological grounds, eschew appeals to preference *shifts*. Becker colorfully warned against "the temptation of simply postulating the required shift in preferences to 'explain' all apparent contradictions to [one's] predictions" (Becker, 1976, p. 5). Personality psychologists, in contrast, view the stability of personality over time as an empirical question. But they conclude that it is indeed highly—though not perfectly—stable throughout individuals' lives.

There are two main empirical approaches to the stability of personality: cross-sectional and longitudinal. The highest-quality cross-sectional studies, based on national samples, find that average personality scores are largely independent of age, at least from 30 onwards. There is however modest evidence that extraversion and openness decrease, and agreeableness increases, slightly with age (Costa and McCrae, 1997, pp. 272–274). Switching to longitudinal data generally makes even these marginal findings go away. Mean levels of individuals "big five" personality scores show no consistent direction of change with age, leading Costa and McCrae (1997) to conclude "the small cross-sectional differences reported earlier were due to generational differences, not maturation" (p. 274).

Further examination of longitudinal data reveals not only mean-level stability, but fairly high rank-order stability as well. At least over a 7-year-interval, for example, the test–retest correlation for the big five personality tests ranged from 0.63 to 0.84 (Costa and McCrae, 1997, p. 279). Correcting for test unreliability raises the estimated level of stability even higher, though still short of unity. Thus, personality shifts are not just implausible explanations for changes in behavior at the aggregate level, they are also unlikely to explain large changes in a single individual's behavior over time.

Admittedly, some critics have raised the possibility that personality stability is artifactual, reflecting for example mere stability of self-*image*, or subject's recollections of their initial answers. But testable alternative hypotheses normally fail empirically. The "stability of self-image" hypothesis would seem to predict low rank-order stability of others' perceptions. In fact, however, rank-order stability is also high for spouse and peer ratings. Similarly, suppose that subject's responses are stable just because they remember their original answers. If this hypothesis were true, the correlation between original scores and *memories* of original scores should at least exceed the correlation between original scores and current scores. Researchers who have tested this prediction have found the opposite is true: people are more likely to mistakenly *believe* they changed their response than they are to actually do so (Costa and McCrae, 1997).

There are however, important exceptions to the rule of personality stability. Before the age of 30, mean levels do systematically change. During their 1920s, people's average levels of agreeableness and conscientiousness rise, while their average levels of neuroticism, extraversion and openness fall. This finding appears in both cross-sectional and longitudinal data. Rank-order stability is also lower for people under 30. Helson and Moane (1987) for instance report that the correlation between personality at ages 27 and 43 exceeds the correlation between personality at ages 21 and 27.

Overall, then, there is a basic *empirical* flaw in economic hypotheses that appeal to preference shifts. At least when proxied by personality, preferences are roughly constant. The source of shifts in behavior must usually lie elsewhere. This is less true, however, in markets where the young play an important role. Following any cohort of young people over time, one should expect to see, for example, a gradual shift towards more conscientious behavior, holding constraints fixed.

4. Some applications of personality to economic questions

Personality psychology provides strong empirical evidence for heterogeneous preferences. But does this preference heterogeneity shed new light on issues of economic interest? This section argues that there are a number of areas where it already has and many more where personality psychology suggests promising new hypotheses.

4.1. Personality, the return to education and signalling

In competitive labor markets, any variable that shifts job performance affects labor earnings as well. An enormous literature within economics examines the determinants of labor earnings, but almost never considers personality as a possible independent variable. One interesting possibility to investigate, then, is whether there is any link between job performance and personality and whether this tends to bias familiar coefficient estimates.

In a wide-ranging meta-analysis, Barrick and Mount (1991) conclude that such a link exists. For every occupational category that they consider, conscientiousness invariably predicts better job performance: it "appears to tap traits which are important to the accomplishment of work tasks in all jobs" (Barrick and Mount, 1991, p. 18). Conscientiousness correlated 0.17 with productivity data, 0.23 with subjective job performance ratings, and 0.17 with salary (Barrick and Mount, 1991, p. 16). Costa's (1996) survey article confirms Barrick and Mount's results, noting further that conscientiousness predicted better job performance for both genders and remained significant controlling for age, sex and years of education.

The underlying intuition is simple: hard-working, diligent and dutiful behavior leads to greater marginal productivity. Some people are much more eager to shirk than others by showing up late, spending their effort on non-work projects, taking their time, stealing office supplies and so on. Preferences for these sorts of behavior throughout the population markedly differ, holding constraints constant. Hence, ceteris paribus, individuals high in conscientiousness make better workers (Hogan and Ones, 1997).

A particularly noteworthy aspect of the conscientiousness—job performance link is that conscientiousness is highly correlated (0.5–0.6) with various measures of educational

achievement but uncorrelated with measured intelligence (Barrick and Mount, 1991, p. 5). Conscientious people are more successful in both school and work. In consequence, rate of return to education estimates that fail to control for conscientiousness are likely to be biased upwards.

The preceding facts about the role of conscientiousness highlight a novel way of operationalizing the signalling model of education (Weiss, 1995). Initially, the most plausible way to apply this model is to posit that education is a signal of *intelligence*. But this interpretation is problematic because of the relative ease of assessing intelligence with low-cost tests (Jensen, 1998). The personality literature raises another possibility: education could be a signal of conscientiousness. One key asymmetry between intelligence and personality tests is that the former, unlike the latter, are incentive compatible. It is essentially impossible to fake higher intelligence, but it is easy to pretend to be highly conscientious on a personality questionnaire. In short, the action of completing years of education speaks louder about individuals' conscientiousness than their words of self-description on a survey form. Insisting on the costly educational signal may be the only way for employers to sustain a separating equilibrium.

While conscientiousness is the only across-the-board predictor of work success, level of extraversion also matters in some occupations. Barrick and Mount (1991) find it to be a positive predictor of job success for both managers and salespeople, but not the other occupational categories that they studied. Briggs Myers and Myers (1993) emphasize a wide variety of occupation-specific links between personality and job performance, arguing that most traits turn out to be functional in one context or another.[10]

4.2. Personality, occupational choice and discrimination

Moving from job performance to occupational choice reveals a still wider scope for personality. The evidence is particularly encyclopedic for the MBTI (Macdaid et al., 1986; Briggs Myers and McCaulley, 1985), but extending these results to the closely related FFM is fairly unproblematic. High openness is strongly over-represented in creative, theoretical fields such as writing, the arts, and pure science, and under-represented in practical, detail-oriented fields such as business, police work and manual labor (Briggs Myers and McCaulley, 1985, pp. 246–248). High extraversion is over-represented in people-oriented fields like sales and business and under-represented in fields like accounting and library work (Briggs Myers and McCaulley, 1985, pp. 244–246). High agreeableness is over-represented in "caring" fields like teaching, nursing, religion and counseling, and under-represented in pure science, engineering and law (Briggs et al., 1985, pp. 248–50). Individuals studying or working in fields atypical for their personality are also markedly more likely to drop out or switch occupations (Briggs Myers and Myers, 1993).

Becker famously observed that criminal activity can be analyzed like any other occupational choice (Becker, 1968). Yet, it is precisely here that Stigler–Becker's "identical preference" approach seems least plausible. Would everyone really be equally prone to

[10] The principle of comparative advantage highlights, moreover, that even if conscientiousness is universally valuable, the efficient outcome is for low-conscientiousness workers to cluster in occupations where this handicaps their performance the least.

turn to shoplifting, robbery, or murder-for-hire if they only faced the same budget constraint? Becker (1993) freely acknowledges that people will sometimes abstain from profitable, undetectable crimes due to "moral and ethical considerations" (p. 390). But given Stigler–Becker's basic approach, such motives would only reduce the *level* of crime. They could not appeal to such motives to explain *variation* in criminality, because preferences for ethical behavior, like other preferences, are ex hypothesi constant across people. In contrast, the empirics of personality strongly indicate that willingness to resort to crime varies widely. Criminals are on average markedly lower in both conscientiousness and agreeableness than non-criminals, even holding other variables fixed.[11] (Costa and Widiger, 1994; Wilson and Herrnstein, 1985) Crime, in other words, is a relatively attractive occupation for those who find workplace discipline burdensome and care little about the welfare of potential victims, just as sales is an attractive occupation for confirmed extraverts. This does not mean that wages in the criminal and non-criminal sectors—or the probability and severity of punishment—are unimportant determinants of criminal activity. But exclusively focusing on these constraints while neglecting potential criminals' unusual preferences is a mistake.

The link between personality and occupational choice also raises questions about some forms of alleged occupational discrimination, especially for gender (Filer, 1986). Stereotypes about personality and gender turn out to be fairly accurate: on both Myers–Briggs thinking–feeling and FFM agreeableness, there are large male–female gaps in the expected directions. Women are about half a standard deviation more agreeable than men; on the binary Myers–Briggs measure, the thinking–feeling breakdown is about 30/70 for women versus 60/40 for men. Given these differences in preferences, one would expect some fields—such as teaching and nursing—to be predominantly female and other fields—like science and engineering—to be predominantly male, even in the absence of any discrimination whatever. Substantial inter-occupational pay gaps could persist over time due to marginal workers' mutual distaste for each other's fields. Personality differences may be unable to provide a full explanation. But the strong connections between personality and occupational choice on the one hand, and personality and gender on the other, suggest that standard gender discrimination estimates that fail to control for personality must be viewed with some skepticism.

4.3. Conscientiousness and the adverse selection puzzle

Empirical tests of adverse selection models, most notably Cawley and Philipson (1999) and Chiappori and Salanie (2000) have reached some anomalous results. Contrary to theoretical predictions, it frequently appears as if low-risk people buy *more* insurance than high-risk people. In the market for life insurance, for example, consumers buy more when their risk of mortality is less. As Cawley and Philipson put it, "while the coefficient on actual risk is not always statistically significant, the point estimates suggest that the relatively risky are less likely to have insurance" (1999, p. 840). One explanation is to rethink

[11] Wilson and Herrnstein rely primarily on MMPI personality scales rather than the FFM, which was just emerging at the time of their writing. But like many other alternative measures of personality, the MMPI is well-captured by the FFM (Piedmont, 1998, pp. 44–45)

the *direction* of the asymmetric information (Cawley and Philipson, 1999, pp. 842–843). Insurance companies might better informed about individuals' risks than the individuals themselves are. Insurees know more than insurance companies about their idiosyncratic risk, but perhaps insurers' actuarial tables more than compensate for this informational disadvantage.

The personality literature suggests a different (though in principle complementary) way to explain this anomaly. There could be a personality trait that leads individuals to act cautiously *and* buy insurance, ceteris paribus. Conscientiousness is a highly plausible candidate for this role, for this factor encompasses attributes such as "thinking carefully before acting", "scrupulously fulfilling moral obligations", and being "organized and thorough" (Piedmont, 1998, pp. 90–91). Individuals low in conscientiousness would seemingly be more likely to, for example, drive recklessly, and start wondering how to cope with an accident *after* it happens. They would also be less concerned about inability to make due amends for accidents they cause, or flouting laws requiring insurance. If all these traits cluster together, the first people to drop out of the insurance pool would be the high-risks, not the low-risks. Holding conscientiousness constant, then, adverse selection could easily still be present, but simply masked by the heterogeneity of preferences.

4.4. "Pathological" behavior and the tails of the personality distribution

Extreme or "pathological" behavior—from habitual myopia to drug addiction—is often viewed as a challenge for the economic approach, though naturally such charges have not gone unanswered (Becker and Murphy, 1988; O'Donoghue and Rabin, 1999). Synthesizing the economic approach with personality differences provides a quite different way of addressing these challenges. Personality researchers have already developed a detailed case that even pronounced psychiatric disorders are frequently nothing more than the tails of familiar continuous personality distributions—not discrete conditions (Morey, 1997; Costa and Widiger, 1994; Costa and McCrae, 1992) The whole range of "addictive" behavior, for instance, can be captured by the trait of neuroticism; similarly, the absence of myopia—or foresightedness—is natural to interpret as an aspect of conscientiousness.

Why not then explain "pathological" behavior primarily as an expression of extreme preferences? A diverse collection of case studies in Costa and Widiger (1994) illustrates that people at the tails of the personality distribution still make reasoned efforts to satisfy their goals (Brooner et al., 1994; Lehne, 1994; Bruehl, 1994). It is the *content* of their goals that is unusual: consuming large quantities of drugs, refusing to conform to basic employer expectations, taking advantage of other people, and so on. While such individuals often profess a desire to change, at least in many cases such claims are strategic, not sincere. By stating their desire to cooperate with therapists, they receive financial assistance and/or avoid more serious punishments. As one would expect of rational agents, they search for ways to retain their benefactors' support while changing their overall behavior as little as possible, and readily revert to their original patterns as disincentives for doing so fall (Lehne, 1994).

Personality is also relevant to the large body of anomalies produced by experimental economics (Camerer, 1995; Rabin, 1998). While these experiments definitely show that the average subject behaves in a certain way, they often overlook the possibility that the

propensity for anomalous behavior varies. The average person is, for example, more myopic and less selfish than economists would expect a priori. One of the few experiments that takes personality into account, Meyer (1992), finds that actors' Machiavellism score (a personality scale which closely overlaps with the negative of FFM Agreeableness) is a strong predictor of self-interested play in the ultimatum game. Boone et al. (1999) similarly link personality to willingness to cooperate in the Prisoners' Dilemma.

Or consider the literature on self-serving bias (Babcock and Loewenstein, 1997). The average person considers himself better than average by a variety of measures. But vulnerability to such biases is still far from universal. Robins and John (1997) surprisingly report that "only about 35 percent of the subjects show a clear self-enhancement bias whereas about 50 percent are relatively accurate and about 15 percent actually show self-diminishment bias" (p. 669). On average, individuals perceive themselves as better than average, but the median respondent does not.

Thus, homoeconomicus can provide a good description of a sub-sample of the population, even though it is a poor description of the average. This might well have important real-world implications: when agents choose their situations—rather than being randomly assigned to them—people who deviate from homoeconomicus may avoid situations where this disadvantages them. People high in agreeableness will avoid managerial positions where they have to weigh people against profits, people low in conscientiousness will avoid self-employment and other positions where myopia is costly, and so on.

5. Conclusion: toward joint estimation

Stigler and Becker pioneered early efforts to apply economic tools to the broadest possible range of questions. But in inaugurating this ambitious project, they were too hasty to dismiss the ability—or at least potential—of other disciplines to serve as valuable inputs. Empirical personality psychology has made remarkable progress towards "explaining tastes", in the sense of reducing them to a small set of coherent dimensions with wide-ranging predictive utility. Rather than continuing to overlook this body of evidence, economists can use it to improve their understanding of a variety of issues, from the return to education and occupational choice to insurance markets and "pathological" behavior.

None of this means that traditional explanations using prices and income are unimportant. But empirical work that excludes measures of personality on principle is almost bound to suffer from omitted variable bias. Attributing all unexplained variation to unspecified preferences, as Stigler and Becker emphasized, systematically overstates the role of preferences. But omitting measures of personality on methodological grounds systematically *under*states the role of preferences. A sensible middle course is to empirically capture both constraints and preferences as well as possible, and let the data decide.

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