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Informationszentrum Wirtschaft Leibniz Information Centre for Economics DISCUSSION PAPER SERIES IZA DP No. 3333 The Economics and Psychology of Personality Traits Lex Borghans Angela Lee Duckworth James J. Heckman

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of personality traits over the life cycle. We develop simple analytical frameworks for interpreting the evidence in personality psychology and suggest promising avenues for future research. JEL Classification: Keywords: I2, J24 personality traits, lifecycle effects Corresponding author: Lex Borghans Department of Economics and ROA Maastricht University P. O. Box 616 6200 MD Maastricht The Netherlands E-mail: lex.borghans@algec.unimaas.nl Duckworth's work is supported by a grant from the John Templeton Foundation. Heckman's work is supported by NIH R01-HD043411, and grants from the American Bar Foundation, The Pew Charitable Trusts, and the Partnership for America's Economic Success, and the J. B. Pritzker Consortium on Early Childhood Development. Ter Weel's work was supported by a research grant of the Netherlands Organisation for Scientific Research (grant 014-43-711). Chris Hsee gave us very useful advice at an early stage. We are grateful to Arianna Zanolini for helpful comments and research assistance. We have received very helpful comments on various versions of this draft from Gary Becker, Dan Benjamin, Dan Black, Ken Bollen, Sam Bowles, Frances Campbell, Flavio Cunha, John Dagsvik, Michael Daly, Kevin Denny, Liam Delany, Thomas Dohmen, Greg Duncan, Armin Falk, James Flynn, Linda Gottfredson, Lars Hansen, Joop Hartog, Moshe Hoffman, Bob Hogan, Nathan Kuncel, John List, Lena Malofeeva, Kenneth McKenzie, Kevin Murphy, Frank Norman, David Olds, Friedhelm Pfeiffer, Bernard Van Praag, Elizabeth Pungello, Howard Rachlin, C. Cybele Raver, Bill Revelle, Brent Roberts, Carol Ryff, Larry Schweinhart, Jesse Shapiro, Rebecca Shiner, Burt Singer, Richard Suzman, Harald Uhlig, Sergio Urzua, Gert Wagner, Herb Walberg, and participants in workshops at the University of Chicago (Applications Workshop), Iowa State University, Brown University, University <https://assignbuster.com/econstor/>

College Dublin, and Washington State University. The views expressed in this paper are those of the authors and not necessarily of the funders or commenters listed here. Supplemental tables are available online at: <http://jenni.uchicago.edu/econ-psych-traits/> * Borghans, Duckworth, Heckman, and ter Weel 2 I. Introduction There is ample evidence from economics and psychology that cognitive ability is a powerful predictor of economic and social outcomes. 1 It is intuitively obvious that cognition is essential in processing information, learning, and in decision making. 2 It is also intuitively obvious that other traits besides raw problem-solving ability matter for success in life. The effects of personality traits, motivation, health, strength, and beauty on socioeconomic outcomes have recently been studied by economists. 3 The power of traits other than cognitive ability for success in life is vividly demonstrated by the Perry Preschool study. This experimental intervention enriched the early family environments of disadvantaged children with subnormal intelligence quotients (IQs). Both treatments and controls were followed into their 40s. As demonstrated in Figure 1, by age ten, treatment group mean IQs were the same as control group mean IQs. Yet on a variety of measures of socioeconomic achievement, over their life cycles, the treatment group was far more successful than the control group. 4 Something besides IQ was changed by the intervention. Heckman et al. (2007) show that it is the personality and motivation of the participants. This paper examines the relevance of personality to economics and the relevance of economics to personality psychology. Both economists and psychologists estimate preference parameters such as time preference, risk aversion, altruism, and, more recently, social preferences, to explain the behaviors of individuals. The <https://assignbuster.com/econstor/>

predictive power of these preference parameters, their origins and the stability of these parameters over the lifecycle, are less well understood and are actively being studied. Borghans, Duckworth, Heckman, and ter Weel 3 Economists are now beginning to use the personality inventories developed by psychologists. This paper examines these measurement systems and their relationship with the preference parameters of economists. There is danger in economists taking the labels assigned to psychologists' personality scores literally and misinterpreting what they actually measure. We examine the concepts captured by the psychological measurements and the stability of the measurements across situations in which they are measured. We eschew the term "noncognitive" to describe personality traits even though many recent papers in economics use this term in this way. In popular usage, and in our own prior work, "noncognitive" is often juxtaposed with "cognitive". This contrast has intuitive appeal because of contrast between cognitive ability and traits other than cognitive ability. However, a contrast between "cognitive" and "noncognitive" traits creates the potential for much confusion because few aspects of human behavior are devoid of cognition. Many aspects of personality are influenced by cognitive processes. We show that measurements of cognitive ability are affected by personality factors. We focus our analysis on personality traits, defined as patterns of thought, feelings, and behavior. We do not discuss in depth motivation, values, interests, and attitudes which give rise to personality traits. Thus, we focus our discussion on individual differences in how people actually think, feel, and act, not on how people want to think, feel, and act. This omission bounds the scope of our work and focuses attention on traits that have been measured. We refer the interested reader to McAdams (2006), Roberts et al. <https://assignbuster.com/econstor/>

(2006), and McAdams and Pals (2007) for an overview of the literature in psychology on aspects of personality that we neglect. 5, 6 Our focus is pragmatic. Personality psychologists have developed measurement systems for personality traits which economists have begun to use. Most prominent is the “ Big Five” Borghans, Duckworth, Heckman, and ter Weel 4 personality inventory. There is value in understanding this system and related systems before tackling the deeper question of the origins of the traits that are measured by them. The lack of familiarity of economists with these personality measures is one reason for their omission from most economic studies. Another reason is that many economists have yet to be convinced of their predictive validity, stability or their causal status, believing instead that behavior is entirely situationally determined. Most data on personality are observational and not experimental. Personality traits may, therefore, reflect, rather than cause, the outcomes that they are alleged to predict. Large-scale studies are necessarily limited in the array of personality measures that they include. Without evidence that there is value in knowing which personality traits are most important in predicting outcomes, there is little incentive to include sufficiently broad and nuanced personality measures in empirical studies. Most economists are unaware of the evidence that certain personality traits are more malleable than cognitive ability over the life cycle and are more sensitive to investment by parents and to other sources of environmental influences at later ages than are cognitive traits. Social policy designed to remediate deficits in achievement can be effective by operating outside of purely cognitive channels. This paper shows that it is possible to conceptualize and measure personality traits and that both cognitive ability and personality traits predict a variety of social and

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economic outcomes. We study the degree to which traits are stable over situations and over the life cycle. We examine the claim that behavior is purely situation-specific and show evidence against it. Specifically, in this paper we address the following questions. 1. Is It Conceptually Possible to Separate Cognitive Ability from Personality Traits? Borghans, Duckworth, Heckman, and ter Weel 5 Many aspects of personality are a consequence of cognition, and cognition depends on personality. Nonetheless, one can separate those two aspects of human differences. 2. Is It Possible to Empirically Distinguish Cognitive from Personality Traits? Measures of economic preferences are influenced by numeracy and intelligence. IQ test scores are determined not only by intelligence, but also by factors such as motivation and anxiety. Moreover, over the life cycle, the development of cognitive ability is influenced by personality traits such as curiosity, ambition, and perseverance. 3. What Are the Main Measurement Systems in Psychology for Intelligence and Personality, and How Are They Validated? Most personality psychologists rely on paper-and-pencil self report questionnaires. Other psychologists and many economists measure conventional economic preference parameters, such as time preference and risk aversion. We summarize both types of studies. There is a gap in the literature in psychology: it does not systematically relate the two types of measurement systems. Psychologists seeking to create valid personality questionnaires balance multiple concerns. One objective is to create questionnaires with construct-related validity defined as constructs with an internal factor structure that is consistent across time, gender, ethnicity, and culture. A distinct concern is creation of survey instruments with predictive validity. With notable exceptions, contemporary personality psychologists

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seeking direct measures of personality traits privilege construct validity over predictive validity in their choice of measures. 4. What is the Evidence on the Predictive Power of Cognitive and Personality Traits? We summarize evidence that both cognitive ability and personality traits predict important outcomes, including schooling, wages, crime, teenage pregnancy, and longevity. For many outcomes, certain personality traits (that is, traits associated with Big Five Borghans, Duckworth, Heckman, and ter Weel 6 Conscientiousness and Emotional Stability) are more predictive than others (that is, traits associated with Agreeableness, Openness to Experience, and Extraversion). Tasks in social and economic life vary in terms of the weight placed on the cognitive and personality traits required to predict outcomes. The relative importance of a trait varies by the task studied. Cognitive traits are predictive of performance in a greater variety of tasks. Personality traits are important in explaining performance in specific tasks, although different personality traits are predictive in different tasks. The classical model of factor analysis, joined with the principle of comparative advantage, helps to organize the evidence in economics and psychology. 5. How Stable Are Personality Traits Across Situations and Across The Life Cycle? Are They More Sensitive than Cognitive Traits to Investment and Intervention? 7 We present evidence that both cognitive and personality traits evolve over the lifecycle— but to different degrees and at different stages of the life cycle. Cognitive processing speed, for example, tends to rise sharply during childhood, peak in late adolescence, and then slowly decline. In contrast, some personality traits, such as conscientiousness, increase monotonically from childhood to late adulthood. Rank-order stability for many personality measures peaks between the ages of 50 to 70, whereas IQ reaches these same levels of

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stability by middle childhood. We also examine the recent evidence on the situational specificity of personality traits. Traits are sufficiently stable across situations to support the claim that traits exist, although their manifestation depends on context and the traits themselves evolve over the life cycle.

Recent models of parental and environmental investment in children explain the evolution of these traits. We develop models in which traits are allocated differentially across tasks and activities. Persons may manifest different

levels of traits in different tasks and activities. Borghans, Duckworth,

Heckman, and ter Weel 7 6. Do the Findings from Psychology Suggest That

Conventional Economic Theory Should Be Enriched? Can Conventional

Models of Preferences in Economics Explain the Body of Evidence from

Personality Psychology? Does Personality Psychology Merely Recast

WellKnown Preference Parameters into Psychological Jargon, or is There

Something New for Economists to Learn? Conventional economic theory is

sufficiently elastic to accommodate many findings of psychology. However,

our analysis suggests that certain traditional concepts used in economics

should be modified and certain emphases redirected. Some findings from

psychology cannot be rationalized by standard economic models and could

fruitfully be incorporated into economic analysis. Much work remains to be

done in synthesizing a body of empirical knowledge in personality

psychology into economics. The evidence from personality psychology

suggests a more radical reformulation of classical choice theory than is

currently envisioned in behavioral economics which tinkers with conventional

specifications of preferences. Cognitive ability and personality traits impose

constraints on agent choice behavior. More fundamentally, conventional

economic preference parameters can be interpreted as consequences of

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these constraints. For example, high rates of measured time preference may be produced by the inability of agents to delay gratification, interpreted as a constraint, or by the inability of agents to imagine the future. We develop a framework that introduces psychological variables as constraints into conventional economic choice models. The paper proceeds in the following way. Section II defines cognitive ability and personality traits and describes how these concepts are measured. Section III considers methodological issues that arise in interpreting the measurements. Section IV presents evidence Borghans, Duckworth, Heckman, and ter Weel 8 by psychologists and economists on basic economic parameters. Section V examines the predictive power of the traits studied by personality psychologists who, in general, are a distinct body of scholars from the psychologists measuring economics preference parameters. Section VI examines the evidence on the evolution of preference parameters and personality traits over the life cycle. We summarize recent work in psychology that demonstrates stability in preference parameters across diverse settings. Section VII presents a framework for interpreting personality and economic parameters. Recent work in behavioral economics and psychology that seeks to integrate economics and psychology focuses almost exclusively on preference parameters. In contrast, we present a broader framework that includes constraints, skill acquisition, learning as well as conventional preference parameters. Section VIII concludes by summarizing the paper and suggesting an agenda for future research.

II. Definitions And A Basic Framework Of Measurement And Interpretation We distinguish between cognitive ability on the one hand and personality traits on the other. We do not mean to imply that personality traits are devoid of any elements of cognitive processing, or

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vice versa. Schulkin (2007) reviews evidence that cortical structures associated with cognition and higher level functions play an active role in regulating motivation, a function previously thought to be the exclusive domain of sub-cortical structures⁸. Conversely, Phelps (2006) shows that emotions associated with personality traits are involved in learning, attention, and other aspects of cognition. A distinction between cognitive ability and personality traits begs for a specific definition of cognitive ability. Before defining these concepts, we first review the rudiments of factor analysis, which is the conceptual framework that underlies much of the literature in psychology, and is a basis for unifying economics with that field. We use the factor Borghans, Duckworth, Heckman, and ter Weel 9 model as an organizing device throughout this paper, even in our definitions of cognitive and personality traits.

A. Factor Analysis Central to psychology and recent empirical work at the intersection of economics and psychology is the concept of factors. Let $T_{i,j}$ denote performance on task j for person i . There are J tasks. The task could be a test, or the production of tangible outputs (for example, assembling a rifle or managing a store). Individuals perform many tasks. Output on tasks is generated in part by latent "traits" or factors. Factors or psychological traits for individual i are represented in a vector f_i , $i = 1, \dots, I$, where I is the number of individuals. The vector has L components so $f_i = (f_{i,1}, \dots, f_{i,L})$. The traits may include cognitive and personality components. Let $U_{i,j}$ be other determinants of productivity in task j for person i . We discuss these determinants in this paper. The task performance function for person i on task j can be expressed as (1) $T_{i,j} = h_j(f_i, U_{i,j})$, $i = 1, \dots, I$, $j = 1, \dots, J$. Different factors are more or less important in different tasks. For example, a purely cognitive task would place no weight

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on the personality components in vector f_i in generating task output. 9

Linear factor models are widely used in psychology. These models write (2)

$T_{i,j} = \hat{\mu}_j + \hat{\lambda}_{ij} f_i + U_{i,j}$, $i = 1, \dots, I$, $j = 1, \dots, J$, where $\hat{\mu}_j$ is the mean of the j th task and $\hat{\lambda}_{ij}$ is a vector of factor loadings. The number of components in f_i , L , has to be small relative to J (L