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Challenges in Research on Preferences and Personality Traits: Measurement, Stability, and Inference

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ABSTRACT

Challenges in Research on Preferences and Personality Traits: Measurement, Stability, and Inference

This paper reviews several traditions in economic research on preferences as well as research on personality traits in personality psychology and lists challenges in both fields. We discuss challenges regarding the measurement of preferences and personality traits, challenges regarding the stability of preferences and traits, and challenges when inferring causality. Additionally, we highlight areas in which we see potential benefits from taking into account methodological approaches or insights from the respective other discipline.

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1. Introduction

Research on preferences and personality traits is a blossoming field in economic and psychological science. Economic preferences and personality traits are related concepts in the sense that both are characteristics of an individual that have been shown to predict individual decision making and life outcomes across a wide variety of domains.[1] Moreover, both preferences and personality traits are assumed to have a high degree of stability over time although the definition of stability varies across disciplines. Despite these commonalities, important aspects of preferences and personality traits such as their conceptual foundation or approaches to their measurement differ substantially. As a consequence of the similar interests and goals but differences in approaches, economic research on preferences can benefit from taking into account insights from personality psychology and, vice versa, personality psychology can benefit from traditions in economics. This is the main argument put forward in this paper.

We first provide an overview on traditions in economic research on preferences and research on personality traits in personality psychology. We then discuss (1) challenges regarding the measurement of preferences and personality traits, (2) challenges regarding their stability, and (3) challenges when inferring causality. Moreover, we point out areas which may benefit from taking into account methods or insights from the respective other discipline.

2. Measuring preferences and personality traits

The three key dimensions of economic preferences are time, risk, and social preferences. In brief, time preferences refer to how individuals decide on trade-offs between earlier and later rewards. Risk preferences describe how much risk an individual is willing to take, and social preferences reflect an individual's degree of altruism or envy. Measures of preferences are based on theoretical models. More specifically, economists rely on the assumption that individuals maximize their utility when making decisions. Preferences are fundamental parameters of utility functions.

Measures of economic preferences typically make use of monetary trade-offs (over time when measuring time preferences; by varying degrees of uncertainty when measuring risk preferences; or in interactions between individuals when measuring social preferences). Economists follow the revealed preference paradigm that infers preferences from choices, which are often based on incentivized experiments, i.e., individuals are paid according to their own (and possibly others') decisions.[2] In order to measure time preferences, economists ask

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[1] For example, on average more patient individuals obtain higher levels of educational attainment, earn more, are more likely to exercise, to be a non-smoker, and less likely to be obese (Chabris et al., 2008; Golsteyn et al., 2014; Shoda et al., 1990; Sutter et al., 2013). A higher willingness to take risks is positively correlated with being self-employed, investing in stocks, with smoking, and actively participating in sports (Dohmen et al., 2011). Social preferences are positively related to productivity at work in a team production environment (Carpenter and Seki, 2011) and to donations to charity (Cooper and Kagel, 2009). Personality traits also predict real life outcomes (see, e.g., Caspi et al., 2005, Borghans et al., 2016). For instance, conscientiousness predicts educational achievement, occupational attainment, and job performance (Judge et al., 1999).

[2] In line with the tradition in psychology, economists also rely on non-incentivized self-reports concerning economic preferences that do not explicitly refer to monetary tradeoffs. An example of such a self-reported questionnaire measure of risk preferences is the corresponding question in the German Socio-Economic Panel

for instance: "What do you prefer: 100 euros now or 110 euros in one year?". Risk preferences are elicited using questions such as: "What do you prefer: 100 euros for sure or a 50% chance of winning 200 euros and a 50% chance of winning 0 euros?". A standard tool to measure social preferences are so-called dictator games in which one individual (the dictator) receives an amount of money and has to decide how much to give to a second, passive individual (the receiver) and how much to keep for herself.

Psychologists base their measures of personality traits on the lexical hypothesis. Their stance is that if traits are important in people's lives, there will eventually be a word for this trait in their language. These words can then be bundled. One commonly used taxonomy which resulted from this exercise is the Big Five personality traits (Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism; Costa and McCrae, 1992). Openness refers to being open to new cultural or intellectual experiences. Conscientiousness reflects the tendency to be organized, controlled, and hardworking. Extraversion refers to socialness, activeness, and the tendency to orient one's energy to the outer world of other people. Agreeable individuals act in a cooperative, unselfish, and flexible manner. Neuroticism describes a chronic level of emotional instability, proneness to psychological distress, vulnerability, and impulsivity. Almlund et al. (2011) provide a more extensive description of the Big Five.

In order to measure a personality trait empirically, psychologists typically use validated batteries of self-report questions that fulfil criteria such as internal validity, external validity as well as test-retest reliability (see, e.g., Borghans et al., 2008). Internal validity implies that different questions map into the same underlying construct or personality trait, and offer a coherent description of the same individual. External validity (also predictive or behavioral validity) is met if the resulting trait measure has predictive power for actual behavior that should be affected by the respective trait. For example, one would expect higher levels of conscientiousness to map into higher levels of income and wealth and this indeed is the case (see, e.g., Duckworth et al., 2012).

There is a great potential for economists and psychologists to build upon each other's methods (much more than is currently done) in order to improve measures of preferences and traits. Here, we mention some largely unexplored challenges in both fields.

One challenge for economists is to better validate their measures. In this respect, Borghans et al. (2008) propose that measures of economic preference should be subject to the same psychometric standards as measures of personality traits. In personality psychology, measurement tools are often validated by test-retests: a measurement tool is only considered reliable if repeated measurements applied to the same individual over short periods of time, taken under the same conditions, and using exactly the same measurement tool result in sufficiently high correlations (according to a predetermined level such as, e.g., 0.7 or higher). Economists could use this powerful technique when searching for measures of economic preference parameters. A challenge when using this technique which is often overlooked is

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(SOEP) data: "How do you see yourself: are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?" The answers are on an 11-point Likert scale, where the value 0 corresponds to "not at all willing to take risks" and the value 10 means "very willing to take risks" (Wagner, Frick, Schupp, 2007).

the assumption that traits are constant over time between test and retest. The longer the time interval between the tests, the less likely this assumption will hold. Moreover, economists should start comparing the predictive validity of various measures of the same preference systematically in order to increase transparency on their relative predictive power (cf., Dohmen et al., 2011). Internal validity typically does not play any role in measurement of economic preferences. The reason is that economists commonly rely on single-item measurement, e.g., they measure time preference by using a single incentivized experiment. Clearly, economists can benefit from measuring a single preference dimension with multiple experiments and / or questionnaire measures in order to reduce measurement error by averaging over multiple items (for an example, see Kosse et al., 2015).

A challenge for psychologists is to correct for potential biases across individuals in the measurements of traits which occur because participants may implicitly use different anchors on the same scale. For instance, when people are asked to rate to what extent they "Feel comfortable around people" (an item of an Extraversion scale), they may have different reference points in mind leading to different answers. Since economists use hypothetical or incentivized monetary trade-offs, heterogeneity with respect to anchors is less of a problem. Another way to overcome this problem would be to ask participants to answer both psychological questions about themselves and about a fictive individual that is the same for all survey participants (vignette research). The answers on the vignettes can be used to scale the psychological measures. A similar approach is used by Kapteyn, Smith and van Soest (2007) to scale happiness variables.

Although there is a long-standing tradition in experimental psychology in general, well-established and commonly used measures of personality traits are not of experimental nature. This sharply contrasts the argument put forward by experimental economists who emphasize that experiments should be considered the methodological gold standard for measuring preferences since experiments allow for observing real choices under real incentives in well-controlled decision situations that are comparable across individuals (see, e.g., Falk et al., 2016).[3] An interesting avenue for future research in personality psychology could be to develop experimental paradigms for measuring personality traits.

Discussing approaches, attainments, and challenges regarding the measurement of preferences and personality traits lays ground for discussing challenges in measuring their stability as we do in the next section.

3. Stability of preferences and personality traits[4]

The dictum "De gustibus non est disputandum" by Stigler and Becker (1977) has shaped economics for decades: the stability of an individual's preferences over time has been among the basic tenets in economics. As a consequence, economists have explained changes in an individual's behavior by changes in incentives or constraints *for given preferences*.

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[3] When measuring preferences in experiments, a crucial assumption is that subjects consider the experiment in isolation and are not influenced by constraints or circumstances outside of the experiment. For example, when measuring time preferences by confronting subjects with choices between sooner and later rewards of various sizes, subjects should not be influenced by individual credit constraints or interest rates outside the laboratory. Otherwise, measured preference parameters will not be comparable across individuals.

[4] The following three paragraphs in this section build on Schildberg-Hörisch (2017).

In economic theory, stability of preferences is defined as stability at the level of the individual (as opposed to stability of the distribution of preferences in a given population). For example, stability of risk preferences implies that (abstracting from noise) one should observe the same willingness to take risks when measuring an individual's risk preferences repeatedly over time. As a consequence of this strict definition and under the assumption that incentives and constraints have not changed, any changes in measured preferences are attributed to measurement error and considered as noise.

Stability is also a defining aspect of personality traits. However, the concept of stability of personality traits deviates substantially from the one applied to economic preferences. It accommodates some systematic changes while excluding others. In particular, personality traits are considered to be stable if they meet the criterion of rank-order stability. Rank-order stability implies consistency in the rank ordering of individuals according to the intensity of a given trait across repeated measurements and is typically measured by correlations. While rank-order stability is a defining aspect of a trait, mean-level stability is not. Mean-level stability refers to consistency in the average level of a trait over time. Thus, personality psychologists acknowledge the existence of systematic changes in the average level of a trait within individuals over time. Such changes might occur due to aging, new experiences, or traumatic events, for example. Note that even the concept of mean-level stability is weaker than the economic definition of stability: it refers to an "average level" in repeated measurement and not to an exactly constant parameter value.

In personality psychology, empirical research on stability of personality traits has a long tradition. Roberts and DelVecchio (2000)'s meta-analysis reports high levels of test-retest stability of around 0.6-0.75 for adult age and a time span of 6.7 years. At the same time, it is widely accepted that systematic patterns of mean-level changes in personality occur and that they are a function of both temporary and life cycle dynamics (Caspi et al., 2005). In contrast, economists have started empirically investigating the stability of preferences only recently. There is no united field of research yet. One important aim of the articles in this Special Issue is to bring together perspectives from the different subfields that investigate stability of preferences and personality traits.

One strand of economic research explores stability of preferences in panel data over shorter periods of time. Chuang and Schechter (2015) provide an excellent overview of this literature. They document that correlations of individual risk, time, or social preferences at different points in time are typically significantly positive, but moderate in size, i.e., tend to be lower than levels of test-retest stability found in psychology. In this Special Issue, Hardardottir (2017) analyzes the stability of individual time preferences over time. She finds that the ranking of time preferences is rather stable. Moreover, Dürsch et al. (2017) provide the first analysis of stability of ambiguity aversion using an identical experiment design over distinct points in time. They find that 57% of the choices show stable ambiguity preferences over a period of 2 months, i.e., remain in the same category of ambiguity preferences (ambiguity aversion, neutrality, or proclivity, respectively). This is significantly higher than random choices would suggest, but significantly lower than the level of consistency when ambiguity measures are taken back-to-back (75%). Over the same time frame, they do not find a significant decrease in the consistency of risk preferences.

Another strand of research investigates the stability of preferences or personality traits over longer periods of time or the life course as a whole. Roberts and DelVecchio (2000) summarize the corresponding evidence on the stability of personality traits using a meta-analysis. In this Special Issue, Elkins et al. (2017) investigate the stability of personality over an eight-year time frame in adolescence and young adulthood using nationally representative panel data from Australia. They show that unconditional mean-level changes in personality traits are small. Research on children's or adolescents' stability of preferences that is based on panel data is very rare (two exceptions are Deckers et al. (2015) who discuss stability of time, risk, and social preferences in 7 to 10 year old children and Kosse et al. (2015) who focus on social preferences). Regarding the development of risk attitudes from late adolescence to old age, Dohmen et al. (forthcoming), Sahm (2012), and Schurer (2015) disentangle birth cohort and period effects from age effects and document that individuals become less willing to take risks over the life course. We are not aware of similarly comprehensive papers on the long-term stability of time or social preferences.

A further perspective focuses on systematic, but only temporary deviations from underlying "baseline" preferences or personality traits due to temporary variations in self-control, time pressure, cognitive load, emotions, or stress, for example. This rapidly growing literature at the intersection of economics and psychology is partly inspired by dual-system theory (for a recent review, see Alós-Ferrer and Strack, 2014). In this Special Issue, Lindner and Rose (2017) analyze the stability of time preferences under time pressure. They run a laboratory experiment with a within-subject design that uses a convex time budget approach in order to measures preferences. They find preferences to be rather stable across situations with and without time pressure. This is both true at the aggregate level as well as for the majority of individual level estimates of present-bias and the curvature of the utility function, while subjects are less impatient under time pressure.

Still another somewhat scattered field studies whether exogenous shocks such as economic crises, natural catastrophes, or violent conflicts affect preferences or personality traits lastingly. Chuang and Schechter (2015) provide a brief review of the corresponding economic literature. In this Special Issue, Anger et al. (2017) identify causal effects of job losses on openness to experience. Using plant closures as an exogenous shock, they find that openness to experience increases for displaced workers with high levels of education and for those who find a job soon after plant closure. Other psychological traits remain stable. Golsteyn and Magnée (2016) use miscarriages as an instrument for age difference between siblings and show that a larger age gap has negative effects on personality traits (i.e., more disorganized behavior, more neuroticism, and more introversion).

Mandel et al. (2017) contribute to this Special Issue by investigating time-inconsistent behavior and present a perspective that is complementary to preference stability: a stable utility function can explain why predicted future behavior deviates from actual future behavior without any changes occurring except for time passing. Mandel et al. (2017) develop a new classification method based on O'Donoghue and Rabin's (1999) theory of time-consistent, naïve, and sophisticated individuals and show that it predicts future behavior more accurately than standard self-control scales.

The brief overview of the literature in this section highlights that evidence on the stability of preferences is accumulating. Still there is a need for more research on the stability of preferences and personality as many open questions remain. In particular, an overall theoretical framework on preference changes is lacking.

4. Inference

One ultimate aim of research on preferences and personality traits is to enhance our understanding of individual decisions and life outcomes such as educational attainment, labor market outcomes, or health status. An often ignored problem in this line of research is that essentially the causal relationship of a single preference or personality trait on an outcome cannot be established. Suppose one would like to analyze the effect of risk preferences on income. The problem is that (even in a laboratory setting) it is not possible to change risk preferences and exclude the possibility that something else also changed as a result of the intervention (see, e.g., Golsteyn et al., 2014). For instance, when changing risk preferences, one may also change time preferences as the future is inherently more risky than the present.

Besides eliciting causal evidence, a further challenge lies in the combination of optimizing the internal consistency and the predictive validity of traits. The standard approach to defining constructs in personality psychology is based on factor analysis. This technique is useful but it has a number of downsides for analyzing how personality relates to outcomes. Factor analysis aggregates a set of measurements that are designed to capture a construct arrived at through intuitive considerations, conventions, and correlations among the underlying items. The measurements and clusters of tests are not selected on the basis of predictive validity in terms of real world outcomes (e.g., success in college, performance on the job, earnings). Developing factor analysis techniques which maximize both on the basis of construct-related validity and predictive validity seems to be a promising avenue for future research (see Borghans et al. 2008).

5. Conclusions

Economists have started building on constructs and methods that are traditionally used by personality psychologists in their work. This paper suggests that both economists and psychologists can learn from each other's methods to elicit preferences and personality traits. We discuss several examples of ways in which this may be achieved.

Economists have also begun investigating the stability of preferences over time, slowly catching up with a long-standing tradition of research in personality psychology on the stability of personality traits. As a result, theoretical modelling and empirical evidence regarding the stability of preferences is growing in various subfields of economics. By acknowledging that an individual's preferences may change under specific circumstances, economists take an important step towards the view held in psychology that the decision environment (beyond incentives and constraints) affects an individual's decision making (Schildberg-Hörisch, 2017). An overarching theoretical framework on preference stability other than the very strict stability definition advocated by Stigler and Becker (1977) that could

accommodate emerging empirical findings and provide testable hypotheses is however still lacking. This Special Issue features some of the current empirical work in this exciting field.

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