Comments on

Personality Psychology and Economics

by

Almund, Duckworth, Heckman and Kautz

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This is a wonderful overview, sure to be standard citation in economics.

What I want to do in these comments is indicate some ways that psychological ideas are instantiated in economic models as well as how this instantiation creates statistical challenges, and so hopefully form basis of discussion.

To do this, I follow ADHK and contrast standard choice theory with their approach.

Standard Approaches to Choice Under Uncertainty

The standard economist's view of behaviors under uncertainty follows the expected utility paradigm.

Individuals make choice l based on

$$\max_{l \in B(Z_i)} \int U\left(Z_i, \varepsilon_{i,l}\right) \mu_i^e\left(\varepsilon_{i,l} \middle| F_i\right)$$

The elements of this decision problem are:

$B\left(Z_i\right)$ is a constraint set.

Examples include budget sets, sets of discrete alternatives.

Z_i allows for heterogeneity in constraints, may or may not be observable to analyst

Comment: there is a question as to whether constraint sets are known or not, which I ignore.

$U\left(Z_i, \varepsilon_{i,l}\right)$ utility or payoff function; algebraic instantiation of preference ordering.

Different elements of Z_i may be operational depending on choice.

$\varepsilon_{i,l}$ represents factors that affect utility that are not known to agents at time of choice.

$\mu_i^e\left(\varepsilon_{i,l}\middle|F_i\right)$ is subjective probability measure over unobserved heterogeneity.

F_i describes information set of *i.*

Beliefs are typically treated as probability measures; some work in decision theory backs off this assumption.

What is Essential in this Approach to Modeling Choices?

Choices are purposeful; jointly determined by preferences, constraints and beliefs

ADHK's achievement is to expand the domain of determinants/descriptions of the three choice components in ways that reflect psychological richness yet preserves the choice-based logic of economics.

Comment: It is not the case that economists are wedded to particular rationality assumptions; we are wedded to purposeful decisionmaking.

Purposefulness does have a backdoor implication for rationality in that economists are generally skeptical of repeated, systematic mistakes, for example.

Also, formulation of utility functions is predicated on certain types of rationality assumptions, such as transitivity of preferences.

Key Modelling Strategy

Explicitly introduce personality traits f_i into the different aspects of the decision problem.

This can be done in two ways. First, one can think of the determinants of choice as personality-trait specific. This is what ADHK refer to as the public goods model; the idea is that the personality traits are fixed and present in all contexts.

Second, personality traits may represent mental resource endowments that are themselves allocated. I only have a limited amount of self-control and so need to allocate. I focus on the former for simplicity.

A major advance in ADHK is that the set of behaviors that are chosen is expanded beyond the economist's usual domain. They introduce an additional layer of choices such as affect, self control, etc. that interact with the standard choice variables of economic models.

This approach, which may be hierarchical in terms of choices of psychological traits, or simultaneous with standard economic choices, is new from the perspective of economic theory. By treating traits as endogenous, one has the "variable-based" approach to modeling that provides a natural segue to empirical work.

Why this Strategy is Important

The variables based approach forces a direct parallel between theoretical model and econometric work.

An equilibrium for a population or a decision rule for an individual in the theory becomes a likelihood function or estimating equation for the econometrics.

Traits and Choice

An important feature of the paper is the recognition that all three choice determinants are affected by personality traits.

This is different, in my view, from the formulations that have become standard in behavioral economics.

The transition from $U\left(Z_i, \varepsilon_{i,l}\right)$ to $U\left(Z_i, \varepsilon_{i,l}, f_i\right)$ is the most intuitive one for economists.

Patience is a good example as it can be expressed a rate of time preference.

A more complicated example is time inconsistency; it is possible to treat time inconsistency as a type of individual preference ordering (Gul and Pesendorfer), although other approaches (Levine and Fudenberg) treat it as a conflict between multiple selves.

The transition from $\mu_i^e\left(\varepsilon_{i,l}\middle|F_i\right)$ to $\mu_i^e\left(\varepsilon_{i,l}\middle|F_i, f_i\right)$ is more controversial, and underresearched.

While there is now much work on bounded rationality by economists (psychologists-no snickering!) I am not aware of work among behavioral economists that links information processing to personality traits.

One (cheap) way to proceed is to allow personality traits to affect priors; this would allow for standard Bayesian updating as information is acquired.

Notice degenerate priors allow for personality types whose beliefs are fixed.

But this is probably too mechanical. If information consists of data flow, there is question of interpretation of each piece of data; personality traits can matter here as well. I am not aware of work in economics that links personality traits to updating.

“Skeptical” is, I conjecture, a personality trait.

The transition from $B(Z_i)$ to $B(Z_i, f_i)$ is also relatively unintuitive for economists. (Here I disagree with ADHK that this is the most obvious place for personality traits to enter, but this is not important)

Economics of identity may speak to this.

Impulse control failures may involve temporary constrictions of constraint set.

Question for Discussion

How does ADHK approach relate to David Funder's personality triad, based on the Lewin (1951) equation

$$B = f\left(P, S\right)$$

where

B is a behavior

P is personality

S is situation

One Picky Comment

Variations proposed in Funder (2009): $P = f\left(B, S\right)$ and $S = f\left(B, P\right)$ did not make sense to me.

For one thing, why do these functions exist? One does not imply existence of others. It is not clear mappings are one-to-one.

More on this at the end.

How Does One Instantiate Traits in Particular Cases?

The abstract structure of ADHK does not identify (of course) the best way to instantiate various personality traits in different contexts. This is where new “applied theory” (not an oxymoron but econospeak) is needed.

One example is self control failure. When I lose my temper and yell at someone; has my constraint set shrunk, or the utility of yelling increased? This hints at identification problems if one wants to situate where personality traits affect decisions.

Example: Ethics

Where do ethical beliefs fit into this framework?

Why do I abjure from vengeance in various contexts? To be concrete, why do I decline to hurt the feelings of those that have hurt feelings of my children?

If the reason is compassion or guilt, then we can think of ethics as part of preferences; this is standard in economics and common in behavioral economics.

Vengeance refusal seems inconsistent with this a preference based view. Unwillingness to consider vengeance seems closer to a limitation on my constraint set. Certain actions are not considered because I regard them as wrong.

The problem with this latter view is that it does not allow for tradeoffs; ethical aspects of choice are prioritized (made lexicographic in econospeak). This also has a philosophical implication as it treat ethics deontologically rather than in a consequentialist fashion.

One way to proceed is that violation of ethics imposes costs. If these are distinguished from payoff reductions, then perhaps involve the constraint set.

Suggests a possibility of “moral prices” and “moral budget constraints”. Notice these prices and endowments would be context dependent.

ADHK’s introduction of costs to actions which depend on personality traits is, in my judgment, important and should be further developed.

Segue from Theory to Statistics

ADHK embodies a particular philosophy of empirical work in social science in that it develops theory driven ways of assessing personality traits.

Within economics, there is much “fighting” over the best way to do empirical work, with a number of researchers openly dismissing economic theory in favor of empirical methods that amount to transforming data so that they are interpretable as the outcome of a randomized experiment.

In my view, the ADHK philosophy is the correct one.

The emphasis on randomized experiment analogs in data analysis has several basic limitations; these are covered in Heckman's writings including those listed for the conference.

I make a few points for the sake of debate.

1. The possible questions that can be answered are unduly delimited by requirement that data can be transformed in a way that randomized experiment analogy applies.

   It is meaningful to ask what caused World War I, for example.

2. Properties of the data such as self-selection are treated as nuisances, rather than as sources of information.

   Self-selection is the outcome of a behavioral choice and hence can be informative about reasons for the choice. Examples exist where identification fails under random assignment but holds under self-selected assignment.

3. Focus on randomized experiments, as a practical matter, diverts attention in unhelpful directions.

   The search for instrumental variables is reified as an end in itself, even though instrument validity cannot be assessed independent of a model. Often identification is achieved based on failure of imagination.

4. Randomized experiment philosophy misconstrues the role of assumptions. Assumptions change the questions that can be answered. There is an assumptions/possibilities frontier.

   The idea that more assumptions makes inference less credible is misleading because the domain of what is inferred is affected. (This is a facet of Heckman's well known argument that causality is the property of a model.)

Example: Exposure to Violence and Subsequent Violent Behavior

Several years ago a paper in *Science* claimed that exposure to violence led to violent behavior in youths. The paper had a rich set of controls and was able to identify, in particular, siblings, one of whom had observed street violence, the other who had not.

Those exposed were more likely to commit violence.

Did this show that situational factors have persistent effects? No. The paper never addressed *why* one sibling had been exposed but not the other. Textbook example of self-selection on unobservables.

Example*: Ordinary Men*

To be clear, one can learn things without explicit theoretical models. One example is Christopher Browning's findings in *Ordinary Men* that 10-20% of Order Battalion 101 refused genocidal orders in occupied Poland. Most outspoken opponent, Heinz Buchmann, was a Nazi party member from 1937.

Metaphorically similar to identification at infinity in terms of situation. No interesting analogy to randomized treatment.

Statistics

Of course, statistical analysis is complicated and many identification problems exist.

I focus on one example, the information content of observations of behaviors $\omega_{i,j}$ where j denotes context. (Construct validity in psycholospeak.) Assume behaviors are determined by

$$\omega_{i,j} = \Phi\left(Z_i, f_i, f_i^c, C_j\right)$$

Here, C_j represents context j and f_i^c denotes personality traits other than f_i.

The idea that similarity in choices across contexts reveals a personality trait, can be seen to be problematic.

In other words, implications of observations of choices may not map to personality traits.

Note: aspects of what I will say are very similar to arguments I have found in Brent Roberts' writings.

One way to think about the problem is as follows. Suppose that the behavior follows a threshold model.

$$\omega_{i,j} = 1 \text{ if } \phi\left(Z_i, f_i, f_i^c, C_j\right) > 0;\ 0 \text{ otherwise}$$

This threshold model is the foundations of much binary choice analysis.

I employ both because of data reduction from ϕ to ω is of interest and because many behaviors/survey questions have discrete structure. (Ordered choice would be even better.)

One Empirical Question

What inferences may be drawn about rank order order across i when one considers the rank order of $\overline{\omega}_i$?

Rank orders have particular importance in theories of distributive justice, e.g. John Roemer, where one is interested in ranking individuals by degree of responsibility for certain behaviors; Roemer's theory is interpretable as requiring rank orders for personality variables.

Example: If one is interested in measuring a moral trait, one has to figure out how to deal with observed behaviors of Kurt Gerstein.

Comment: perhaps theory of concomitant statistics could be of use.

Comment: The construct validity question is reminiscent of a question asking whether there is assortative matching between an outcome and a trait, without observations of the trait.

Leading Case

If f_i and C_j are scalars and $\frac{\partial^2 \phi(f, C)}{\partial \theta \partial C} \geq 0$, then it is clear that rank order of $\bar{\omega}_i$ reveals rank order in f across individuals, i.e. the rank orders are identical.

If $\frac{\partial^2 \phi(f, C)}{\partial \theta \partial C} \leq 0$, then the rank orders are reversed, hence rank order of f again perfectly revealed.

Contrast these cases with the simplified version of the ADHK formulation of average actions which is the analog of the general binary choice model I outlined.

$$\bar{\omega}_i = \int 1_{\phi\left(f_i, f^c, Z, C\right)} \mu\left(Z, C, f^c \mid f_i\right)$$

Notice this formulation assumes unobservable heterogeneity in that Z_i is treated as a latent vector. Observable components become part of conditioning.

General versions of this example are an important empirical insight of ADHK and Heckman's previous work.

There are (at least) two classes of problems that need to be addressed.

First, high dimensional system of latent variables compared to the objects one wants to reveal.

Second, nonlinearities in the system break the uniform nonnegative or nonpositive cross partial assumptions.

Example of the Complications

Differences in variance of f^C across individuals can affect $\bar{\omega}_i$; this issue was previously shown by Heckman to invalidate standard tests of discrimination.

Comment: In general, not meaningful to discuss analysis of variance between personality traits and other factors or to run horse races on which types of factors are most closely correlated with behaviors.

What Is To Be Done?

Statistical solutions include latent variable analysis, of which factor analysis is key.

Social science solutions involve explicit modeling of decision problems, which allows for a priori restrictions on nonlinearity. ADHK undersell their contribution here.

Examples

If effort interacts with personality, then even if one choice maps to one trait, then effort w.r.t. that choice is affected by other choices and other traits. This is why “personality budget constraint” is no important.

To the extent that choices of contexts j are endogenous, this requires selection corrections. Comment: selection corrections are economic theory-driven, not statistical fixes.

All of this speaks to the need for a choice-based framework for empirical work.

Final Query

ADHK suggest that personality, as opposed to personality traits, may be thought of as a strategy for choices, where these choices are broadly defined to include effort, etc.

Does this capture what psychologists mean by personality?

Is it important to have a way of conceptualizing/measuring personality as opposed to personality traits?

Final Speculation (Hopefully not a euphemism)

Is personality an emergent property, i.e. something to be defined at a higher order than its determinants?

In physics, examples of emergent properties include ice and magnetism.

If so, then categories that define traits need not map to categories that define personality types.

Properties of this type depend on the distribution of heterogeneity across individuals and the strength of interdependences.

Comment: processes are often nonergodic, which means more than one aggregate property consistent with specification of individual elements, this is the absence of the one-to-one relation I mentioned w.r.t. to Funder. (To be clear, not important for Funder's argument)

Comment: this approach emphasizes heterogeneity as well as commonality in populations. Hopefully consistent with approach of differential psychology.

To push this speculation, ADHK focus on the idea of personality as a strategy which combines various factors including personality traits. A missing ingredient may be the strategies of others. Interdependences may say something about equilibrium personality distribution in a population.

And is it possible for different combinations of the factors ADHK discuss to produces higher order personality types, perhaps identified in terms of behaviors in certain contexts? Kurt Gerstein is an example of such a type, I think.