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ARTICLE

Hayekian psychological economics: a preliminary look

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Abstract
Recently, there has been a lively discussion of "Hayekian Behavioral Economics" in *Behavioral Public Policy*). We aim to contribute to this debate by identifying the main building blocks of a Hayekian psychology. We highlight that the starting point for Hayek was the quest to understand why humans are typically quite successful in navigating the world. In Hayek's framework, the individual mind is conceptualized as a "system within a system", i.e., the mind is a complex adaptive system that is continuously interacting with the wider socio-cultural system. Three core ideas are central to a Hayekian psychology: subjectivity, learning and adaptation. We argue that these ideas are quite different from the still dominant heuristics-and-biases perspective and lead to different emphases in economic and social science explanations. One, economists should be cautious in their interpretation of experimental findings since subjective meaning is central to agents' behavior. Two, static and isolated models of individuals' biases might underestimate people's capacity to learn with and from others. And three, despite complex processes of adaptation of the mind and the market, a Hayekian framework is consistent with economists' "explanations of the principle" and "pattern predictions."

Keywords: adaptation; evolution; Hayek; learning; psychological economics; subjectivism

Introduction

Recently in this journal, there has been a discussion of "Hayekian Behavioral Economics" and its implications for behavioral public policy (Rizzo and Whitman, 2023; Sugden, 2023; Sunstein, 2023). In particular, Sunstein has argued that regulatory interventions based on behavioral insight on people's biases would be consistent with a Hayekian worldview. In this paper, our goal is not to criticize Sunstein's arguments. Instead, we aim to be constructive and outline the contours of what we call *Hayekian Psychological Economics.* Our motivation to do so is the observation that the theory of the individual agent economists commit to has implications for the way they combine psychology with economics and the type of policy interventions they advocate. Currently, the heuristics-and-biases approach in the tradition of

Kahneman and Tversky serves as the main psychological framework for behavioral economics and public policy discussions (Hoff and Stiglitz, 2016). For instance, influential nudge literature is explicitly built on the heuristics-and-biases approach (Thaler and Sunstein, 2021). As a consequence, behavioral economists have located the essential policy problem at the level of individual choice and peoples' cognitive and behavioral biases (Chater and Loewenstein, 2023). Yet, other psychological frameworks with potentially different types of policy implications exist in the literature, e.g., Gigerenzer's account of *simple heuristics* or Smith's account of *ecological rationality* (Dekker and Remic, 2019). We argue in this article that Hayekian psychology is another framework that yields original insights on how to combine psychology with economics.

While we hint at some implications for regulatory efforts at the end of the article, we do not draw normative conclusions from Hayekian psychology due to space limitations. Also, we are not summarizing or restating Hayek's whole theoretical psychology. The latter has already been done and discussed extensively in the literature.[1] We rather want to flesh out key psychological ideas that follow from or are compatible with Hayek's system of thought as outlined in his book *The Sensory Order* (Hayek, [1952] 2017). Also, we aim to carve out the elements of Hayekian psychology that are relevant to economic analysis, particularly at the level of individual decision-making processes.

In what follows, we first summarize the core tenets of Hayekian psychology. We focus our discussion on key ideas of *The Sensory Order*, such as *mental classifications, primacy of the abstract*, *rules of action, social distribution of knowledge* and *processes of adjustment and adaptation* (Section "Some fundamentals of Hayekian psychology"). Based on this summary, we draw implications for a psychological economics. While we begin with Hayek, we do seek to expand on what he has written.[2] We emphasize several core ideas: the analogy between mind and market, the logic of choice, meaning, external representation, institutional individualism and prediction (Section "Implications for economic and social science explanations"). The final section concludes and highlights some important differences between Hayekian psychological economics and the dominant approach in contemporary behavioral economics (Section "Conclusion").

Some fundamentals of Hayekian psychology

In contrast to the heuristics-and-biases program, Hayek ([1952] 2017) is not interested – in the first instance – in how people make costly mistakes in acquiring knowledge or how the social process of knowledge transmission may break down. He is primarily interested in how we ever get things right in the first place. He states that "before we can explain why people commit mistakes, we must first explain why they can ever be right" ([1937] 2014, p. 58).[3] The world is complex and we

[1]See, e.g., Butos and Koppl (1997), Caldwell (2004), Butos (2010), Butos and McQuade (2015), Vanberg (2017), and Lewis (2014, 2017a).

[2]A useful distinction can be made between Hayek's explicit claims in contrast to their implications and extensions that could be called "Hayekian."

[3]See Boettke *et al.* (2013) on why Hayekian psychological economics begins with the question of how an individual could ever be right. Hayek acknowledges the value of psychological realism in economic

are finite beings. How can we cope? Of course, once we have a basic understanding of how and when things go right, we can begin to understand how they can go wrong. A second difference with the heuristics-and-biases program is that the goal for Hayek is not simply a parametric economic theory. In other words, he is not interested in constructing better comparative statics by adding new psychological parameters to existing *as-if models* of expected utility maximization. Instead, he wants to understand *actual decision making* by studying psychological processes of adaptation and learning.

Primacy of the abstract

In *The Sensory Order,* Hayek ([1952] 2017) makes a fundamental claim about perception. The empirical world is structured by our consciousness. The concept of raw experience makes little sense, although some experiences might be more highly structured than others. In this, Hayek takes a position against the naïve realism of the behaviorists as well as against the correspondence theory of the mind. Reality does not simply impress itself on our minds. Hayek sometimes calls this the "primacy of the abstract." Nevertheless, he also says that the so-called empiricists have not been "radical or consistent enough" ([1952] 2017, p. 160). A truly radical understanding of the empirical world reveals it as structured to human consciousness.

These structures or "classifications" can be complex, multiple and proceed on many levels. These classifications are selected by *pragmatic needs* and evolutionary accidents.[4] Selection is therefore by consequences and the learning derived from this process. There is both species learning (over long periods) and individual learning (over relatively short periods).

Rules of perception are, through this selection-by-consequences process, rules of action. They guide or even constitute our capacity to move in the world. But since classifications are tied to purposes and the attainment of purposes does not require complete knowledge, our classifications and thus our knowledge are always *partial.*

The structure of the central nervous system evolves over time, with connections among neurons gradually forming in response to environmental stimuli. Different people encounter different environments, and therefore receive different stimuli, so that their minds evolve in different ways over the course of their lives. As a consequence, people develop different perspectives on reality, at least in part because they have different mental classificatory systems (Lewis, 2014).

Not all structures and classifications need to be conscious. Highly repetitive activity can become just-barely conscious habits in an individual's life. Other classifications may be so fundamental that they needn't rise to the level of consciousness. In other cases, a certain economy of thought evolves and thus processes become tacit or implicit. It is clear that Hayek does not privilege conscious knowledge. In fact, he believes that very many of the most important rules human beings follow are not conscious.[5] Moreover,

decision-making processes. Yet, he does not infer the existence of widespread market failures from agents' limited cognitive abilities.

[4]The latter make it possible that certain structures may not be adaptive.

[5]Building upon Hayekian insights, Vernon Smith (2007, p. 32) states that "human activity is diffused and dominated by unconscious, autonomic, neuropsychological systems that enable people to function effectively without calling upon the brain's scarcest resource: attention and self-aware reasoning circuitry."

even purposes may not be conscious or explicit as when people are instinctively repelled by harsh smells or rodents. Purposeful action does not require conscious direction.

Since the ultimate test of our rules, classifications and actions is their consequences, reasoning is *experimental*. We test our hypotheses first in our own minds based on our experience or the experience of others. Obviously, this saves us from making actual mistakes which might be very costly. The concept of an "intellectual experiment" captures this idea. Hayek's notion of the "model" is important here. The model describes the pattern of nerve impulses that are active at any moment within the brain. The model embodies expectations of events the person has learned to associate with certain stimuli; it will "thus constantly tend to run ahead of the actual situation" ([1952] 2017, p. 239). If the model's expectations are repeatedly disappointed, old neural pathways tend to wither and new ones are formed. The result of this experiential learning is a new "model" with a different set of expectations (Lewis, 2017b, pp. 13–15). On this point, Hayek follows Popper: learning is conjecture and refutation.

Rules

The mind classifies on the basis of rules. Or perhaps better, the classification system is a system of rules. If stimulus A occurs, then a certain network of neural pathways will be activated and a classification made. At (roughly) the same time that the classification is made a certain propensity to act will result. So there will be a mapping between the class of stimuli and an action or class of actions. This is what is meant by following a rule.

Viewed from the perspective of individuals in conditions of uncertainty, we cannot plan our actions beforehand to meet every eventuality. Therefore, it is reasonable to expect that individuals will follow rules. An adapted rule will produce good results on the whole, but it is likely to produce unfavorable consequences in many instances. Hayek argues that the coherence of actions lies not in being part of a single plan but in their being instantiations of a rule. This suggests that actions need not display the usual criteria posited by the standard axioms of rationality, including transitivity (Rizzo, 2019).

As we have seen, for Hayek, rules of action and rules of perception are intimately related. Thus when rules of action fail, it is likely that the perceptual field of the individual will get reorganized. He will begin to see things differently and reclassify the elements of the environment. There will be either conscious or unconscious revision of the relevant rules of action. The process of rule revision takes place within a framework of relatively permanent rules (legal, social, economic) which limit the possibilities of revision, but also focus on the expectations of individuals trying to navigate within the overall system (Hayek, 1976: Ch. 10).[6]

Social distribution of knowledge

As we move to the social level, the partial character of knowledge reveals itself in the *social distribution of knowledge*. Individuals will know differently because they are situated differently. Moreover, individuals will behave differently in the *same* situation because of different learning histories. This means that the social system is filled with diversity of knowledge and action. In an evolutionary framework,

[6]On this point, see also Lachmann (1971) and Vaughn (1999).

diversity is a key element in the selection process (the rough equivalent to nature's random mutation). This generation of diversity is necessarily sloppy. There will be errors and consequences will be felt. Nevertheless, as with any evolutionary process, the optimum will not be known beforehand and cannot be planned. Furthermore, in a diverse environment, there will not be a unique global optimum. Adjustments are unending.

The acquisition and transmission of knowledge (and thus rules of behavior) are social processes. We always rely on knowledge acquired by others including the technological advances pioneered by others. Even more fundamentally, our conception of what constitutes an adequate test of an idea and the standards for claiming that an idea or hypothesis is true, corroborated, verified or falsified are social. We often convince ourselves by what we would imagine will convince others.

Processes of adjustment and adaptation

Rules of perception as well as their associated rules of action incorporate expectations. Successful navigation in the world requires that expectations be tolerably correct. The perception of fire should correspond to actual fire; the avoidance of fire should correspond to actual avoidance. When this does not happen, the system of classifications adjusts. But since each agent is at least loosely tied to her history there is no direct impression of reality upon the mind. This is a practical aspect of Hayek's rejection of the correspondence theory. New neural pathways must be substituted for the old.[7] This takes time. The rational expectations approach, on the other hand, completely abstracts from the psychology of expectation, the partial and incomplete nature of knowledge, and usually agent diversity as well.

There is no clear distinction between short-run or even long-run processes of adjustment, on the one hand, and evolutionary change, on the other. The process of evolution is made up of a series of changes in time. The processes run into each other, so to speak. For Hayek in his *Sensory Order* framework, the emphasis is on evolutionary processes. Nevertheless, this should not be taken to mean that all processes of adaptation occur only over long stretches of time. Many rules are propensities to act in a class of ways that vary with current circumstances.[8] Perhaps the most important feature of evolutionary explanations is that they cannot rely on the representative agent to do all of the work. Evolution proceeds through diversity and selection. Diversity is almost inevitable in this framework because each agent has a different history of incomplete and partial knowledge. This means that expectations will differ. Some will turn out to be correct and others incorrect.

Implications for economic and social science explanations

It is not easy to separate the methodological and substantive implications of Hayekian psychology for social and economic thought. This is perhaps due to

[7]As Earl (2010, p. 218) remarks, " … Hayek's analysis allows for underlying neural connections to be strengthened by the repeated firing of particular combinations of sensory inputs. By extension, it also allows for memory decay due to established connections not being fired up to make sense of new inputs because these particular connections have not been useful for finding patterns."

[8]This is one kind of "phenotypic plasticity." It is analogous to "within a generation" variation in evolutionary biology. See Gordon (1992, pp. 255–262).

the rather high level of abstraction at which he and his commentators and interpreters have discussed his ideas. In what follows we organize the implications of his framework by dealing with the most general first and then proceeding to the more particular and specific.

The analogy between mind and market

For Hayek, both the mind and market are complex adaptive systems (Lewis, 2017b, p. 13). The actions of individuals "are both *constituents* of complex systems (social, economic) and the *result* of the organization of a complex system (the nervous system)" (Weimer, 1982, pp. 241–42, emphasis added). The primary function of the mind is the classification and reclassification of its environment. In so doing, the mind induces actions that will themselves alter the circumstances of the individual and cause further reclassifications and adjustments. In markets, individuals may respond to changes by altering what they believe are marketable goods, appropriate selling strategies, the prices that buyers are willing to pay, and so forth. These are all (re)classifications of the stimuli in the market. Many factors, including what the individual has personally learned in her history of market or other experience, will determine the nature of the (re)classifications – too many, it would seem, to be predictable at the individual level.

Moreover, the market itself will create new classifications, as an emergent property of the individual actions that comprise it. As a result of changes in the environment, individuals will change the prices they offer or demand, errors will be corrected and new prices, new products and new marketing strategies will emerge. The ways that people behave change because they are reconceiving, reinterpreting, reorganizing – that is, reclassifying – the data they receive. The aggregate result is not what any particular individual desires but the result of many interactions among the individuals.[9] Further interactions occur as individuals adjust their behavior to the classifications produced by the market. At some point, perhaps for a short time, if there are no major changes, individuals will settle into routines – classes of responses to classes of market inputs. This is not to say, however, that either the mind or the market are equilibrium systems. They are in a continual (and continuous) state of active adaptation.

The logic of choice

The Sensory Order emphasizes the role of rules in both perception and decision-making. But what does this mean for the "pure logic of choice" or models of utility maximization under constraints? Hayek nowhere discards that logical structure in view of his psychological theory. In a series of lectures delivered in 1961, 10 years after the publication of *The Sensory Order*, Hayek ([1961] 2014) embarked on a "new look" at economic theory. We have not, however, been able to detect any important psychological insights in his new look at the economic calculus.

[9]This is analogous to the interaction among neurons that form the sensory order in our minds.

Hayek says that we are both rule-following and purpose-seeking. The decisions of individuals are the result of both. Rules "determine or limit the range of possibilities within which we choose consciously" (Hayek, [1962] 2014, p. 246). Thus rules will exclude certain decisions.[10] The overlapping or superimposition of many rules may exclude more and more. Nevertheless, there will be a core of conscious weighing of costs and benefits characterizable by the logic of choice.

The excluding aspect of unconscious rules may take the form of a delimited range of attention. Some options will not occur to individuals. Some means of attaining the options that do occur may not be visible to the individual. Importantly, these are not simply instances of what economists normally call imperfect knowledge. They are "unknown unknowns." *Unconscious* rules that exclude are not recognized as excluding in specific cases. "Thus even decisions which have been carefully considered will be in part determined by rules of which the acting person is not aware" (id., p. 246–7).

This implies that when economists model individual decisions in terms of utility maximization under constraints, they are modeling only an *aspect* of the decision process. Neither the calculations people make nor the unconscious rules they follow are individually sufficient to determine choices ex ante. It is the complex interplay between unconscious rules and calculation *during the decision process* that will lead to certain choice outcomes. In many cases, this means that economists cannot predict precisely what the outcome of this process will be.

The exclusions created by *unconscious* rules are not necessarily sources of error in view of a realistic individual psychology. Attention cannot be unlimited; by definition, it must be focused. To focus is to exclude. What is useful to exclude will depend on individual external circumstances, interests, and even age, sex and status (Hayek, [1967] 2014, p. 280). Memory of previous similar, successful decisions will also play an important role. In this sense, the "rationality" of individual choice is always a bounded rationality, that is purpose-seeking is bounded by unconscious rules. Bounded rationality thus understood is not primarily associated with agents' limited cognitive abilities or willpower. Instead, it emphasizes the functionality of cognitive boundedness since unconscious rules are the result of adaptive processes of selection-by-consequences (see Section "Primacy of the abstract"). Of course, such processes can lead to rules that are at times maladapted to current choice problems. But such maladaptations tend to be temporary since short-term individual-level learning counters maladaptations, particularly if the costs of errors are high.[11]

Meaning: interpersonal and contextual

A fundamental element in the transmission of knowledge is communication. Communication in turn requires understanding the meaning other people attach to

[10]Rules do not only exclude. They may also provide "certain routine ways of achieving the object" (id., p. 246).

[11]Space constraints prevent us from developing Hayek's theory of learning in this article. We intend to do so in future work. Here, it suffices to highlight the central roles of *reward prediction errors*, *associated costs*, and *the surprise produced by the divergence between prediction and reality* for individual learning processes. The importance of error for effective learning is well-documented in the experimental literature (see, e.g., Metcalfe, 2017).

their actions. How can we interpret the meanings of other individuals? This would appear to be especially challenging because different people have different perspectives and (partial) knowledge and are situated differently. Hayek's answer is that we can understand other people insofar as they follow the same rules of perception and behavior. Since these rules are abstract, they can accommodate different factual circumstances and contexts. We have common needs and desires and in a common culture similar means of satisfying them.[12]

The Weberian idea of *Verstehende Soziologie* is given a basis by Hayek's psychology.[13] We – both analysts and agents as well – can understand the meaning of the actions of others in an *intuitive* way because or insofar as we follow the same *unconscious* rules, we recognize their behavior. Clearly, in everyday life, we do not have the cognitive resources to subject all actions of others to explicit analysis. "Intuition" is not to be denigrated as necessarily sloppy thought. It is part of our economy of mind.

For Hayek, the meaning individuals give a particular situation follows the logic of acquired mental categories ("the primacy of the abstract") and is an essential prerequisite for making sense of *the particular*. Individuals' interpretation of a novel situation necessarily relies on existing mental categories that sort situations in types or classes which have been acquired (largely unconsciously) over the course of their lives.[14] The mind associates certain rules of behavior with a certain class of situations based on successful patterns of action of the past.[15]

To know what to do in a decision situation or social interaction, the first question that arises in an individual's mind is: what does this situation mean to me? The answer to this question depends on what abstract class (or classes) of situations this particular situation "activates" in the individual's mind. If the individual recognizes the situation as an instantiation of a well-specified class, the meaning and consequently the required action will be straightforward.

An example would be the well-known kindergarten study by Gneezy and Rustichini (2000). In this study of daycare centers in Israel, a fine was introduced for parents who would pick up their children late (the price of lateness went from 0 to 10 Israeli shekels which was about $3 at the time). The intended goal of the intervention was to incentivize parents to come on time so that the kindergarten teachers would not have to work extra hours. From a standard economic perspective, the study revealed two surprising findings. One, the number of parents who picked up their

[12]Moreover, people are keen to communicate so that all sides have powerful incentives to make their wishes in exchange activity clear. But much about individual contexts will not be relevant in any given interaction.

[13]Following Lewis (2011, p. 189), this involves a reinterpretation of the notion of *Verstehen*, away from viewing it *epistemically*, as a method whereby social scientists grasp empathetically the meanings that people attributed to their surroundings and actions, towards viewing it *ontologically*: as a way of being in the world whereby interpretive understanding is something that normal people accomplish, mostly without difficulty, in everyday life.

[14]It is also, as mentioned before, to some degree, the result of our species' evolution.

[15]"Our habits and skills, our emotional attitudes, our tools, and our institutions – all are in this sense adaptations to past experience which have grown up by selective elimination of less suitable conduct. They are as much an indispensable foundation of successful action as is our conscious knowledge" (Hayek, [1960] 2011, p. 77).

children late increased after the fine was introduced (the frequency of late pick-ups doubled). And, two, when the fine was removed after a 12-week period, the number of late pick-ups remained higher than it was at baseline before the intervention. How to explain this puzzling finding? Standard economics suggests that the higher the price of a "good" (here, the late pick-up of your child), the less people demand it. But this logic cannot explain why the pick-ups remained high when the price dropped.

If we acknowledge that incentives (such as fines) come with a meaning, the observed behavioral pattern might be quite reasonable. Before the fine was introduced, most parents were on time because they classified the interaction as one of "ethical obligation" or "reciprocal responsibility". Yet, when the fine was introduced, the situation was reclassified in the subjects' minds (at least of some parents). Now the interaction was classified as a "market transaction". Lateness was given a price and so it could be purchased, like bread or beer. This explains why some people opted to buy more of the good "take care of my kids." Since the number of late pick-ups remained high even though the fine was removed, it is reasonable to assume that the reclassification of the situation in the subjects' minds was permanent. In this example, the rationality of individuals might be questioned as they appear to violate the fundamental law of demand. But this is an illusion because once the individuals' meaning of the context is established, we see that their behavior does respond to incentives and is quite reasonable. The determination of meaning must come before the ascertainment of rationality.

This discussion also offers some important insights for the interpretation of laboratory experiments in economics. Let's consider the ubiquitously analyzed dictator game where one player (the dictator) is given an amount of money X (the endowment) that she can fully keep for herself or give an amount $Y \leq X$ to another player (the recipient). In real experiments, the dictator gives on average 20–30% of the endowment to the recipient. Standard interpretations of these findings in economics treat people as purely purpose-seeking, i.e., individuals are modeled as agents that optimize a utility function subject to constraints. Since dictators are observed to give a substantial amount of their endowment to recipients, it is now common in behavioral economics to introduce other people's attainment y (one purpose) besides the agents' own payoff x (another purpose) into their utility functions, i.e., $u_i(x, y)$.

While this standard approach adds some realism to how economists model individual behavior, it still has limitations. For instance, how can this approach explain that individuals become less generous in dictator games (and other laboratory experiments) the more experience they have with such experiments (Arechar and Rand, 2022)? Does this mean that people's utility functions change? For an explanation of such findings, we should ask what meaning do the experimental subjects actually give to the game. This simple question can lead to interesting insights (Kimbrough, 2022): for instance, one might find that the first time a subject is introduced to the highly abstract dictator game, he recognizes it as belonging to a class of situations called "windfall gains"; this activates the internalized rule that gains, which are not the result of one's own effort, are to be shared. Yet, as individuals play this game more often, they do not rely on an acquired decision rule anymore. Instead, they learn to classify the situation as its own distinct type of interaction with its own

rules. The acquired "windfall rule" no longer applies; the laboratory situation is now "just a game" in which the rule is to "win".

Note that this approach starts with an explicit acknowledgment that laboratory games are artificial and unfamiliar settings in which the mind relies on analogies to give available choices their meaning. Moreover, it does not think of subjects as purely purpose-seeking, but also as rule-following agents. We think Hargreaves Heap (2022, p. 56) is right in arguing that "[people] come to the lab with a repertoire of decision rules that they frequently use outside the lab, and the lab experiment is (potentially) a device for eliciting the character of these rules." Interestingly, since this means that experiments reveal actually existing decision rules, the Hayekian approach can be seen as defending the external validity of experiments. This is the case at least when experimenters focus their attention on the detection of heuristics (understood as ecological adaptations to similar real-life situations) and they do so before individuals learn to classify the lab game as its own distinct type of interaction.

A general take-away is that Hayek's economic psychology does not reduce the interpretation of experiments to "observed behavior" but tries to understand the meaning individuals give to lab games and the decision rules that a particular decision situation activates. In other words, it requires experimental economists "to listen more carefully" to their subjects. This approach might require the inclusion of some non-traditional research methods into economic experiments, such as analyzing what people type in chat boxes during the experiment or what they say after the experiment when they ask the experimenters what the latter were "getting at." It is often surprising to see how interested subjects are in finding out what the "intended meaning" of a certain experiment is (Kimbrough, 2022, p. 44).

External representation

While Hayekian psychology explains the acquisition and use of decision rules on the individual level, many rules do not strictly exist in the individual mind but are instead "stored" externally in an individuals' social environment in the form of "thought aids" or "cognitive institutions" (Dekker, 2022). This insight helps explain the puzzle of how individuals manage to achieve their tasks and coordinate their activities reasonably well given their limited cognitive abilities. Although individuals are *bounded* in their rationality, they can make reasonably good decisions *in interaction with* their social environment.

In his earlier writings, Hayek (1937, 1945) stresses the cognitive function of the price mechanism. Prices act as "aids to the mind" that enable "society to engage in far more complex methods of production than could be deliberately planned by a single mind" (Lavoie, 1985, p. 180). The price system works "as a kind of machinery for registering change" (Hayek, 1945, p. 527): prices communicate dispersed knowledge about the relative scarcity of a particular local resource. If the price increases, market participants can infer that it has become scarcer; yet, they do not need to know the cause of it, or how the resource is used on different markets. In being cognitively frugal, prices allow market participants to focus their limited mental powers on relevant features of the market process. Prices as are thus an essential part of the cognitive system that allows "rational" action and coordination to take place (Hayek, 1937,

1945).[16] This insight on the cognitive function of the price system leads Hayek to make a more general point: "We make constant use of *formulas, symbols* and *rules* whose meaning we do not understand and through the use of which we avail ourselves of the assistance of knowledge which individually we do not possess" (Hayek, 1945, p. 528, emphasis added).

Hayek's account is compatible with the idea of "distributed cognition" in psychology (Dekker and Remic, 2019, p. 297; Fleetwood, 1996, p. 742).[17] In this approach, cognition is not understood as a single (internal) representation of the mind. Instead, it starts from the idea that the social environment is itself part of the extended cognitive structure of individuals. The "*formulas, symbols* and *rules*" we rely on when making decisions are called *external representations* (Zhang, 1991). Individuals "offload" cognition to those external representations by using and modifying the environment (Hollan *et al.*, 2000).[18] Simple examples would be house numbers, street names or a GPS in a car. Individuals "plug into" the cognitive system of these external representations when reading off its informational signals and they contribute to their ongoing functionings, e.g., by visibly numbering their houses or agreeing to share their data with the GPS provider. Other forms of external representation aid the individual in getting cognitive input from others. When an individual writes down an idea or model, others can see inside her mind, so to speak, and give her feedback. This will tend to expand the effective cognitive capacity of the individual. In the market context, product categories and reference points such as exemplary goods can be external representations that emerge from the interaction among market participants (Dekker, 2022). They enhance the ability to recognize relevant differences and similarities between goods. Thus, they are ways for market participants to reduce complexity and deal with uncertainty.

Taken together, Hayek's approach goes beyond the recognition of prices as "thought aids" and stresses other cognitive institutions that function as an "extended mind" and facilitate the quality of the market process. In this sense, his approach is far less individualistic than the heuristics-and-biases approach in behavioral economics in that it highlights the distributed and social nature of the cognitive processes.

Institutional individualism

The distributed cognition view laid out in the previous section challenges methodological individualism in economics. Commentators have noted that Hayek's approach is indeed not well described or fully captured by the term "methodological individualism."[19] Methodological individualism often means that social phenomena can be explained in terms of the actions and ends of isolated, atomistic individuals. Methodological holists, on the other hand, argue that society is more than merely

[16]Smith (1982) coined the term "Hayek hypothesis": that gains from trade can be realized on markets in the presence of diffuse, decentralized information and in the absence of price-taking behavior and centralized market direction.

[17]There are a series of related approaches called "situated", "embodied" or "grounded" cognition.

[18]This view has also been labeled "the extended mind hypothesis." It sees the coupling of the individual mind with the external artifact as a new cognitive entity in its own right (Clark and Chalmers, 1998).

[19]See, e.g., Fleetwood (1996), Caldwell (2004, pp. 717–18), or Lewis (2005, 2014).

a collection of individuals; individual ends and decisions are created and constrained by social forces and subject to conformity.

From our discussion so far, it should have become obvious that the Hayekian approach is not captured fully by either of those two positions. Following Agassi (1975), Hayekian psychological economics can instead be characterized as "institutional individualism." While Hayek attributes an important role to individual action in explaining social outcomes (e.g., his economics emphasizes that the interplay between individual actions leads to unintended social outcomes), his psychology does not assume self-contained individuals whose properties (including their preferences and beliefs) are fixed independent of their social environment (Lewis, 2005, p. 297). Instead, Hayek conceptualizes the individual as a thoroughly social being whose mind is profoundly shaped by social structures, such as rules, traditions and institutions (Dold and Lewis, 2022).

Contrary to a "pure" individualism, a Hayekian position is institutionalist in that it suggests that certain social entities exist and are of primary importance to the social sciences. Examples for social entities are "customs", "tradition" or "culture." These social entities are wholes which cannot be described as merely collections of the individuals who happen to partake in them. But a Hayekian position is still individualist: While it acknowledges that "wholes", such as social groups and institutions do exist, it does not ascribe them any distinct interests. Social groups and institutions have aims and interests only when people act in accord with what they consider should be their aim or interest. Following Agassi (1960, p. 267), the defining characteristic of such an institutional individualism lies in its premise that "institutions mold character and character transforms institutions." Contrary to methodological individualism where social institutions appear only in the *explanandum* or as the outcome of individual actions, in institutional individualism, social institutions can also appear in the *explanans*, and be therefore part of the explanation of individual actions (Udehn 2002, p. 489). In Hayek's account, the individual and society are taken as primary; the individual is affected by society, and vice versa. Social scientists should not reduce psychology into sociology nor reduce sociology into psychology.

Prediction

Hayek makes clear that the theory advanced in *The Sensory Order* does not aim at "fully explaining any particular mental act" ([1952] 2017, p. 165). Crucially, Hayek argues that our limited ability to provide a causal theory of the mind translates into a limited ability to predict human behavior. Hayek emphasizes that "it will never be possible for us to explain or predict … why the human mind under certain circumstances will lead us to certain actions rather than to others" ([1949] 2017, p. 358).

Both the organized complexity of the mind and of the market, as well as the diversity of the units comprising each, means that the explanation and prediction of such systems must remain general. There are a large number of interrelated variables that are also different from one another and thus may not behave in the same way in their interactions. Therefore, Hayek and his expositors say that in the context of complex systems, the scientist is restricted to "explanations of the principle" and "pattern

predictions" ([1952] 2017, p. 173).[20] Nevertheless, it is often unclear what precisely these terms mean.

Frydman and Goldberg (2007) discuss models that fit Hayek's description of pattern prediction or explanation of the principle. We present here simplified versions of two models.

Suppose we have a causal model like this:

$$y_0 = a_0 + b_0 x_0$$

We first allow for a change in the causal structure that is predetermined such that the changes $a_1 - a_0$, $b_1 - b_0$, are set equal to particular values $\bar{A}_{10}$ and $\bar{B}_{10}$. Such a model makes definite or sharp predictions of the outcome variable y. On the other hand, we could allow for those changes in the structure that preserve the initial monotonic relationship between the causal and outcome variables.[21] This means that $\bar{A}_{10}$ and $\bar{B}_{10}$ can take on a number of values such that an increase (decrease) in x is followed by an increase (decrease) in y. This simple model of a not-fully predetermined change in structure implies a pattern prediction. A change in x will be consistent with many changes in y but all of these will be of the same sign as x.

Less abstractly and more to the point of Hayek's psychological economics, we consider changes in expectations of forecasting. Consider a supply and demand analysis where an increase in one of the standard causal variables (say, income) creates excess demand for the good. Suppose this excess demand causes individuals to change their forecasting strategy for the next period's price. In the absence of a fully predetermined change in forecasting strategy, no one will know what the individuals' expected price will be for the next period. Thus, no one will be able to predict the new equilibrium price. However, if we can say something modest about the new strategy, that is, that the forecast will move in the same direction as the excess demand-driven temporary price, but by less than one-to-one, there will be many forecast revision paths. All of the demand paths will be negatively sloped. These will also all produce a higher price and a higher quantity supplied. However, the price or quantity will be underdetermined. Consequently, the model predicts the pattern of the new equilibrium but not its specific features.

Conclusion

F. A. Hayek is well known for his work in economics, particularly, his vision of the market as a discovery procedure and information process system characterized by spontaneous order. Yet, as shown in this article, Hayek was also intensely interested in psychology and claimed that his earlier work on theoretical psychology was the foundation of much of his later social theoretical thinking (Hayek, 1983, p. 256). We argued in this article that Hayekian psychology is an open invitation to economists to ground their theoretical reasoning about market behavior in realistic theories

[20]"When we claim to provide an 'explanation' this will never mean more than an "explanation of the principle" by which the phenomena of the kind in question can be produced … . Though we may be able to explain the general character of the processes at work, their operation may be so complicated in detail as to place their full description forever beyond the power of the human mind" ([1952] 2017, p. 173).

[21]If only a few such changes are allowed, the model will produce a narrower set of predictions. If there are many, the model will produce a wider set of predictions.

of human choice and decision-making processes. As we hope has become clear from this overview, there are several differences between a *Hayekian psychological economics* and *modern behavioral economics* in the heuristics-and-biases tradition. In conclusion, we want to highlight three of them.

First, while modern behavioral economics has focused on individual decision biases and static parametric analysis, Hayek's psychological economics emphasizes the capacities of learning and adaptation. It also sees the individual agent embedded in social rules and institutions (including the market). Thus, Hayek's framework is more dynamic and it gives more room to the explanatory role of social structures in understanding individual action. This point has recently been made by Hoff and Stiglitz (2016). Consistent with Hayek's framework, they understand the individual as an *enculturated actor* whose preferences, perception and cognition are deeply shaped not just by situational framing but by socio-cultural influences.

Second, while behavioral economics evokes the idea of a representative agent with predictable biases, a Hayekian framework highlights individual diversity and the multiplicity of potential "biases" of agents. This has implications for the methodology of psychological economics: it requires a more careful analysis of the role of subjective perception in economic experiments and the way rules and norms that operate in the background have differently shaped people's purpose-seeking tendencies (Hargreaves Heap, 2022; Kimbrough, 2022). It also has implications for regulatory efforts in that planners must take the subjectivity of welfare and the heterogeneity of agents and biases as a serious side constraint on one-size-fits-all behavioral policies (Rizzo and Whitman, 2023).

Third, due to the complexity of the mind and the market, a Hayekian framework restricts economists' efforts to "explanations of the principle" and "pattern predictions." This point provides a psychologically grounded argument against the behavioralist emphasis on point estimation of cognitive biases and acknowledges that there is tremendous inter- and intrapersonal variation in biases. A psychological phenomenon, such as impatience in intertemporal choice, can be incorporated into economic theory as an important driver of individual and market behavior. However, due to behavioral variability and the presence of confounding factors, point estimates (e.g., of discount rates in models of hyperbolic discounting) should be treated cautiously.

In conclusion, we have presented a potentially fruitful alternative psychological framework to the dominant heuristics-and-biases version of behavioral economics. Psychological economics need not be grounded in a paradigm that emphasizes errors before even attempting to show how things can ever work out right.

References

Agassi, J. (1960), 'Methodological individualism', *The British Journal of Sociology*, **11**(3): 244–270.

Agassi, J. (1975), 'Institutional individualism', *The British Journal of Sociology*, **26**(2): 144–155.

Arechar, A. A. and D. G. Rand (2022), 'Learning to be selfish? A large-scale longitudinal analysis of Dictator games played on Amazon Mechanical Turk', *Journal of Economic Psychology*, **90**: 102490.

Boettke, P., W. Z. Caceres and A. Martin (2013), 'Error is Obvious, Coordination is the Puzzle', in R. Frantz and R. Leeson (eds), *Hayek and Behavioral Economics*, Basingstoke, UK: Palgrave Macmillan, 90–110.

Butos, W. N. (2010), 'The Unexpected Fertility of Hayek's Cognitive Theory: An Introduction to the Social Science of Hayek's "The Sensory Order"', in *Advances in Austrian Economics*, Volume **13**, Bingley: Emerald Publishing, 1–22.

Butos, W. N. and R. G. Koppl (1997), 'The varieties of subjectivism: Keynes and Hayek on expectations', *History of Political Economy*, **29**: 327–360.

Butos, W. and T. McQuade (2015), 'The Sensory Order, Neuroeconomics, and Austrian Economics', in P. Boettke and C. Coyne (eds), *The Oxford Handbook of Austrian Economics*, Oxford: Oxford University Press, 612–642.

Caldwell, B. (2004), 'Some Reflections on F. A. Hayek's *The Sensory Order*', *Journal of Bioeconomics*, **6**: 239–254.

Chater, N. and G. Loewenstein (2023), 'The i-frame and the s-frame: how focusing on individual-level solutions has led behavioral public policy astray', *Behavioral and Brain Sciences*.

Clark, A. and D. Chalmers (1998), 'The extended mind', *Analysis*, **58**(1): 7–19.

Dekker, E. (2022), 'How Cognitive Institutions and Interpretative Rationality Enable Markets with Infinite Variety', in D. J. D'Amico and A. G. Martin (eds), *Contemporary Methods and Austrian Economics (Advances in Austrian Economics)*, Volume **26**, Bingley: Emerald Publishing Limited, 151–167.

Dekker, E. and B. Remic (2019), 'Two types of ecological rationality: or how to best combine psychology and economics', *Journal of Economic Methodology*, **26**(4): 291–306.

Dold, M. and P. Lewis (2022), 'FA Hayek on the political economy of endogenous preferences: an historical overview and contemporary assessment', *Journal of Economic Behavior & Organization*, **196**: 104–119.

Earl, P. (2010), 'The Sensory Order, the Economic Imagination and the Tacit Dimension', in W. Butos (ed.), *The Social Science of the Sensory Order: Advances in Austrian Economics*, Volume **13**, Bingley: Emerald Publishing, 211–236.

Fleetwood, S. (1996), 'Order without equilibrium: a critical realist interpretation of Hayek's notion of spontaneous order', *Cambridge Journal of Economics*, **20**(6): 729–747.

Frydman, R. and M. D. Goldberg (2007), *Imperfect Knowledge Economics: Exchange Rates and Risk*. Princeton, NJ: Princeton University Press.

Gneezy, U. and A. Rustichini (2000), 'A fine is a price', *The Journal of Legal Studies*, **29**(1): 1–17.

Gordon, D. M. (1992), 'Phenotypic Plasticity', in E. F. Keller and E. A. Lloyd (eds), *Keywords in Evolutionary Biology*, Cambridge, MA: Harvard University Press, 255–262.

Hargreaves Heap, S. P. (2022), 'Laboratory Experiments and Austrian Economics', in D. J. D'Amico and A. G. Martin (eds), *Contemporary Methods and Austrian Economics (Advances in Austrian Economics)*, Volume **26**, Bingley: Emerald Publishing Limited, 55–67.

Hayek, F. A. (1945), 'The use of knowledge in society', *The American Economic Review*, **35**(4): 519–530.

Hayek, F. A. (1976), *Law, Legislation and Liberty, Vol. 2: The Mirage of Social Justice*. Chicago: University of Chicago Press.

Hayek, F. A. (1983), *Nobel Prize-Winning Economist Oral History Transcript. Completed under the Auspices of the Oral History Program*. Los Angeles: University of California.

Hayek, F. A. ([1960] 2011), *The Constitution of Liberty*, *The Collected Works of F.A. Hayek*, Volume **17**. Chicago: University of Chicago Press.

Hayek, F. A. ([1961] 2014), 'A New Look at Economic Theory', in B. Caldwell (ed.), *The Market and Other Orders*, *The Collected Works of F.A. Hayek*, Volume **15**, Chicago: University of Chicago Press, 375–426.

Hayek, F. A. ([1962] 2014), 'Rules, Perception, and Intelligibility', in B. Caldwell (ed.), *The Market and Other Orders*, *The Collected Works of F. A. Hayek*, Volume **15**, Chicago: University of Chicago Press, 278–292.

Hayek, F. A. ([1967] 2014), 'Notes on the Evolution of Systems of Rules of Conduct', in B. Caldwell (ed.), *The Market and Other Orders*, *The Collected Works of F. A. Hayek*, Volume **15**, Chicago: University of Chicago Press, 232–253.

Hayek, F. A. ([1952] 2017), 'The Sensory Order', in V. Vanberg (ed.), *The Sensory Order and Other Writings on the Foundations of Theoretical Psychology*, *The Collected Works of F. A. Hayek*, Volume **14**, Chicago: University of Chicago Press, 113–318.

Hayek, F. A. ([1937] 2014), 'Economics and Knowledge', in B. Caldwell (ed.), *The Market and Other Orders*, *The Collected Works of F.A. Hayek*, Volume **15**, Chicago: University of Chicago Press, 57–77.

Hayek, F. A. ([1949] 2017), 'What is Mind?', in V. Vanberg (ed.), *The Sensory Order and Other Writings on the Foundations of Theoretical Psychology*, *The Collected Works of F. A. Hayek*, Volume **14**, Chicago: University of Chicago Press, 348–360.

Hoff, K. and J. E. Stiglitz (2016), 'Striving for balance in economics: towards a theory of the social determination of behavior', *Journal of Economic Behavior & Organization*, **126**: 25–57.

Hollan, J., E. Hutchins and D. Kirsh (2000), 'Distributed cognition: toward a new foundation for human-computer inter-action research', *ACM Transactions on Computer-Human Interaction*, **7**(2): 174–196.
Kimbrough, E. O. (2022), 'Rules, Perception and the Intelligibility of Laboratory Experiments on Social Interaction in Economics', in D. J. D'Amico and A. G. Martin (eds), *Contemporary Methods and Austrian Economics (Advances in Austrian Economics)*, Volume **26**, Bingley: Emerald Publishing Limited, 35–53.
Lachmann, L. M. (1971), *The Legacy of Max Weber*. Berkeley: The Glendessary Press.
Lavoie, D. (1985), *Rivalry and Central Planning: The Socialist Calculation Debate Reconsidered*, Volume **22**. Cambridge: Cambridge University Press.
Lewis, P. (2005), 'Structure, agency and causality in post-revival Austrian economics: tensions and resolutions', *Review of Political Economy*, **17**(2): 291–316.
Lewis, P. (2011), 'Far from a nihilistic crowd: the theoretical contribution of radical subjectivist Austrian economics', *The Review of Austrian Economics*, **24**(2): 185–198.
Lewis, P. (2014), 'Hayek: From Economics as Equilibrium Analysis to Economics as Social Theory', in R. W. Garrison and N. Barry (eds), *Elgar Companion to Hayekian Economics*, Cheltenham, UK: Edward Elgar Publishing, 195–223.
Lewis, P. (2017a), 'Ontology and the history of economic thought: the case of anti-reductionism in the work of Friedrich Hayek', *Cambridge Journal of Economics*, **41**(5): 1343–1365.
Lewis, P. (2017b), 'Shackle on choice, imagination and creativity: Hayekian foundations', *Cambridge Journal of Economics*, **41**(1): 1–24.
Metcalfe, J. (2017), 'Learning from errors', *Annual Review of Psychology*, **68**: 465–489.
Rizzo, M. J. (2019), 'Inconsistency is not pathological: a pragmatic perspective', *Mind & Society*, **18**(1): 77–85.
Rizzo, M. J. and G. Whitman (2023), 'The unsolved Hayekian knowledge problem in behavioral economics', *Behavioural Public Policy*, **7**: 199–211.
Smith, V. L. (1982), 'Markets as economizers of information: experimental examination of the "Hayek hypothesis"', *Economic Inquiry*, **20**(2): 165–179.
Smith, V. L. (2007), *Rationality in Economics: Constructivist and Ecological Forms*. Cambridge, UK: Cambridge University Press.
Sugden, R. (2023), 'How Hayekian is Sunstein's behavioral economics?', *Behavioural Public Policy*, **7**: 189–198.
Sunstein, C. R. (2023), 'Hayekian behavioral economics', *Behavioural Public Policy*, **7**: 170–188.
Thaler, R. H. and C. R. Sunstein (2021), *Nudge: The Final Edition*. New Haven: Yale University Press.
Udehn, L. (2002), 'The changing face of methodological individualism', *Annual Review of Sociology*, **28**: 479–507.
Vanberg, V. (2017), *The Sensory Order and Other Writings on the Foundations of Theoretical Psychology*, *The Collected Works of F, A. Hayek*, Volume **14**. Chicago, IL: University of Chicago Press.
Vaughn, K. I. (1999), 'Hayek's implicit economics: rules and the problem of order', *The Review of Austrian Economics*, **11**(1-2): 129–144.
Weimer, W. B. (1982), 'Hayek's Approach to the Problem of Complex Phenomena: An Introduction to the Theoretical Psychology of The Sensory Order', in D. S. Palermo and W. Weimer (eds), *Cognition and the Symbolic Processes*, Volume **2**. Mahwah, NJ: Lawrence Erlbaum Associates Publishers, 241–285.
Zhang, J. (1991), 'The Interaction of Internal and External Representations in a Problem-Solving Task', in *Proceedings of the 13th Annual Conference of Cognitive Science Society*, Chicago, IL: LEA, 954–958.

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