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RESEARCH ARTICLE

The economics of cognitive institutions: mapping debates, looking ahead

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Abstract

In the philosophy of mind and cognitive science, there is a pronounced paradigm shift associated with the transition from internalism to externalism. The externalist paradigm views cognitive processes as not isolated in the brain, but as interrelated with external artefacts and structures. The paper focuses on one of the leading externalist approaches – extended cognition. Despite the dominance of internalism in economics, in its main schools, there is an emerging trend towards extended cognition ideas. In my opinion, economists might develop the most advanced version of the extended cognition approach: socially extended cognition based on cognitive institutions. This paper analyses extended cognition ideas in institutional, Austrian, and behavioural economics and identifies numerous overlapping approaches and complementary research areas. I argue that the economics of cognitive institutions is a promising field for all economic schools and propose a preliminary research agenda.

Keywords: agency; Austrian economics; behavioural economics; cognitive institutions; co-production; extended cognition; institutional economics; nudges; rationality

Introduction

Although economists have long stopped using the Robinson Crusoe figure to describe individual behaviour, Robinsonades still echo in economic views of cognition that are strongly internalist. Decision-makers are most often portrayed as autonomous individuals whose cognitive processes are isolated in their brains, and the core problem of rational choice is computational and deliberative limitations. On the contrary, in the philosophy of mind and cognitive science, there is a deep paradigm shift towards externalism that considers cognition as a property of interactions between the brain, body, and environment. Moreover, leading theorists of externalism pay main attention to socially extended cognition, which is fundamentally intertwined with cognitive institutions. I believe that a research programme for cognitive institutions can bring together key schools of economics to build a realistic understanding of economic cognition.

This article discusses (1) what advancements have been made in institutional, Austrian, and behavioural economics in the field of extended cognition, and (2) what are the future prospects for economics of cognitive institutions. Section 'Extended cognition and enactivism: a brief overview' provides an introduction to the extended cognition paradigm and explains enactivist ideas of socially extended cognition. Section 'Key ideas of post-Northian institutional economics' discusses key insights of post-Northian institutional economics about the enactive notion of cognitive institutions and their co-production, as well as enactive rationality. Section 'Austrian economics and extended cognition' summarizes the main ideas of Austrian economics (both subjectivist and Hayekian strands) related to extended cognition. Section 'Behavioural economics on the way to a social mind' describes how behavioural economists move beyond internalist and individualistic views of cognition and policy

interventions. Section 'Future prospects for the economics of cognitive institutions' discusses opportunities, limitations, and a tentative research agenda for the economics of cognitive institutions. I conclude that economists have a good chance of shifting (rather quickly and painlessly) to a socially extended cognition paradigm.

Extended cognition and enactivism: a brief overview

Extended cognition is cognition considered as a unity of internal and external parts and processes. The essence of the extended cognition paradigm is that cognition is not primarily the result of neural processes; it is the result of ongoing interrelations and feedback loops between mental, bodily, and environmental elements. This paradigm goes far beyond the traditional internalism of cognitive science: understanding cognition in terms of internal (inside-the-brain) computations and representations of external reality.[1]

The extended cognition paradigm passed through three stages (or waves). The first wave began with the so-called 'extended mind thesis' (Clark and Chalmers, 1998), which stated that individual cognitive processes include both internal (mental) and external (bodily and environmental) elements that are often functionally equivalent. For instance, shopping lists and calculators perform functions similar to brain processes, e.g., memory storage and making calculations; they are not simply external tools for the cognitive processes of customers in the store, but integral parts of these processes. Cognition is embodied (i.e., it is deeply connected with all aspects and elements of the physical body, not just the brain) and scaffolded by external material and non-material artifacts and structures, including institutions.

The second wave of extended cognition research shifted the emphasis from functional parity (similarity) between internal and external parts of cognition to their functional differences, complementarity, and integration into cognitive systems. Neural, bodily, and environmental elements of cognitive processes have different functions and act in different ways. But if they are effectively integrated, all these elements work as a single cognitive system. For example, traders engaged in digital financial markets use multiple screens, constantly monitoring changing market information and communicating with other market actors via online forums and imageboards. Trader's workplace is an example of a functionally integrated cognitive system, in which the brain, the body, and the screen world melt together and are embedded in heterogeneous social interactions (Knorr-Cetina and Bruegger, 2000; Preda, 2017). This cognitive system combines parts of different kinds: mental (trader's neural processes), bodily (e.g., movements of the trader's eyes and arms), and environmental (charts, quotes, analytical tools, digital devices, other traders' behaviours, etc.). Second-wave theories are based on an individual-centred view of cognition, which still continues to dominate cognitive science and, in particular, extended cognition research (Dengsø and Kirchhoff, 2023). Second-wave scholars focus on individual's extended cognitive systems (or coupled agent–environment systems), consisting of heterogeneous internal and external elements; individuals are considered as centres of control and coordination of these systems.

The third wave of extended cognition theory is based on enactivism: a strand in the philosophy of mind that interprets extended cognition in pronounced dynamic and interactional terms (Gallagher, 2017, 2023; Kirchhoff and Kiverstein, 2019). First-wave founder Clark (1997) also emphasized that the flow of thoughts is ongoing interactions between the brain, body, and environmental resources and structures; but in the third wave, the dynamic-interactional view takes centre stage, and social interactions are given special attention. Third-wave theorists shifted their emphasis from an individual-centred view of cognitive systems to socially extended cognition and social cognitive systems.

[1]'4E cognition' (short for embodied, embedded, extended, and enactive cognition) is a popular umbrella label for externalist approaches to cognition; these approaches are both competing and intersecting. In a broad sense, externalism covers both 4E approaches and distributed cognition, situated cognition, and other approaches opposed to internalism. I suggest focusing on the extended cognition approach, which is somewhat compatible with both enactive and embodied approaches (and it also extends the embedded approach).

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Cognitive activity is not only an individual capacity but to a much greater extent a property of dynamic multi-actor interactions that are not controlled by separate individuals. This is not about adding external artefacts to the cognitive resources of the brain to solve an individual's cognitive problems, but about cognition immersed in social cognitive systems, consisting of multiple interacting individuals, groups, norms, practices, and artefacts. Social cognitive systems are distinctly dynamic and have no fixed or stable properties (Kirchhoff, 2012). Normativity is a driving force of socially extended cognition, which is fundamentally interactive and based on coordination, therefore, the role of institutions is crucial (Gallagher, 2013; Slors, 2020).

Social cognitive systems can be large, like the market and the legal system (Gallagher and Petracca, 2024), or rather compact, like a ship crew (Hutchins, 1995) and a heart surgery team (Smith and Semin, 2004). But most individual cognitive processes are socially extended: for instance, in an enactive sense, remembering is a dynamic social interaction responsive to sociocultural norms. Our memories are not rather stable mental states, but dynamically emerging relational outcomes of social interactions (Myin and van Dijk, 2022). In addition, central to the third wave is the concept of active cognitive agency. Cognition is action-oriented: it is in action and for action; it has an active exploratory nature. Socially extended cognition does not mean that individuals are passively embedded in external scaffolds; on the contrary, it includes an active engagement with the environment through exploratory interactions, as a result of which new affordances and resources become disclosed. From the enactive viewpoint, cognition constantly and actively constructs the surrounding world, not just representations of it.

Key ideas of post-Northian institutional economics

Douglass North was one of the inspirations of the first-wave extended cognition theory (Clark, 1997). The first wave viewed institutions in the Northian sense as external scaffolds that support individuals' cognitive processes, from market decision-making to belief formation. In the second wave, scholars' attention shifted from large institutional structures to certain cognitive norms that govern specific cognitive processes in individuals' cognitive systems. According to the third wave, post-Northian institutional economists focus on enactive notion of cognitive institutions in social cognitive systems (Petracca and Gallagher, 2020).

Cognitive institutions in a general sense are internally dynamic and interactively co-produced cognitive norms (Frolov, 2023). Complex cognitive institutions (such as the market, legal system, or science) are heterogeneous systems of interrelated cognitive norms. We can say that cognitive institutions are cognitive-normative platforms for social interactions that are entangled with material artefacts, infrastructures, technologies, etc. Examples of cognitive institutions are extremely diverse: they include socially constructed beliefs, incentives, and conventions (cognitive rules, as they are generally called by Greif and Mokyr, 2017), market categories (Dekker, 2022), intersubjective preferences, decision-making rules, social meanings, identities, narratives, frames, etc. I emphasize that cognitive institutions are not some new type of institution hitherto unknown to institutional economists. Thorstein Veblen wrote about socially prevalent habits of thought, and Wesley Mitchell developed the idea of social concepts as the core of institutions: in fact, they were talking about cognitive norms more than a century ago. Cognitive institutions is not a category term to distinguish some institutions from others, because most often it is impossible to draw a clear dividing line between cognitive and non-cognitive institutions. The vast majority of social institutions simultaneously serve as cognitive ones: they perform cognitive functions among others. For example, when considering the market as a cognitive institution, we mean a specific (cognitive) dimension of the market. Cognitive institutions are a label for enactive way of understanding socially extended cognition. For example, shared beliefs are a long-known phenomenon, but post-Northians propose to consider them not in the first-wave/Northian style as enabling scaffolds for cognition (North, 2005), but in the enactive/third-wave style, as dynamic, interactional (relational), and co-produced cognitive norms.

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Cognitive institutions both enable and very often constitute specific cognitive processes: a constituting role means that without cognitive institutions, many cognitive processes cannot be carried out at all, or their implementation will be much less effective (Petracca and Gallagher, 2020). Cognitive institutions matter because social relations and economic transactions are usually cognitively intractable: they involve difficult cognitive operations. Cognitive institutions prescribe expected or acceptable ways of thinking within specific situations. Thus, they reduce individuals' cognitive efforts and increase their cognitive capacities; individuals can more easily and better understand entangled, turbulent, and ambiguous environments by following collectively accepted cognitive norms.

However cognitive institutions do not simply support individuals to achieve their cognitive tasks through augmenting rather stable cognitive capacities. On the contrary, cognitive institutions play a cognition-transforming role: they constantly transform individuals' cognitive abilities and capacities. Cognitive institutions shape our cognition in the most literal physical sense – they shape our brains, stimulating the emergence of new neural circuits and synaptic connections. These institutions-driven neural changes are because individuals learn to use dynamically changed affordances provided by cognitive institutions, developing appropriate cognitive skills and algorithms.[2] For example, a dispute between entrepreneurs in an arbitration court is conducted by the rules and procedures of this cognitive institution. Entrepreneurs and their lawyers select arguments that benefit them and use thoughtful rhetorical strategies. At the same time, their cognitive actions are inseparable from the ever-changing cognitive institution. Experienced lawyers know how to use existing and emerging legal possibilities, inconsistencies, and gaps to their advantage. These actors' cognitive capabilities are not just well adapted to a given cognitive institution, but are continually transformed by it: they are the result of constant dynamic interaction with the institution. One might say that these actors, by interacting with a cognitive institution, acquire cognitive tools that would not otherwise have occurred to them.

Taking into account individuals' cognitive transformations driven by cognitive institutions, it becomes obvious that all elements of social cognitive systems are permanently dynamic, from brains to norms. Cognitive institutions are not fixed and stable; even in the case of seemingly rigid cognitive institutions, we should emphasize their internal dynamics, which are full of interactions and incremental innovations. A major challenge for the third wave since its inception has been explaining how cognitive institutions are contested and change over time (De Jaegher, 2013). In this regard, an important insight of post-Northian institutional economics is the co-production of cognitive institutions, i.e., their ongoing joint construction by multiple interacting actors with different values, interests, resources, and visions (Frolov, 2023).[3] Cognitive institutions are performative: they must not only be (passively) followed but actively performed through their use in everyday cognitive actions. Individuals not only (passively) learn cognitive norms, but also try to actively identify the hidden possibilities inherent in them of manipulating them and creating non-conventional ways to use cognitive norms. In addition, people discuss, maintain, contest, criticize, protect, and challenge various cognitive norms. In other words, people don't just passively internalize and share ready-made cognitive institutions; they perform these institutions and co-produce them within virtual, real, and hybrid communities.

The co-production of cognitive institutions is a heterogeneous, dynamic, interactional process with multiple actors involved. This process covers both designed and spontaneous activities, both strategic and chaotic actions. Co-producing actors often have diverging interests, conflicting values, and competing visions; they are characterized by resource and power asymmetries. Co-production most resembles collaborative document editing: the document is stored in the cloud, and a lot of people have real-time access to it and can simultaneously make edits, additions, and comments. Likewise,

[2]For early ideas on cognitive transformation, see Menary (2010) and Kirchhoff (2012).

[3]The very idea of co-production is not new: in institutional economics, this approach was fruitfully developed by Elinor Ostrom and her school (see pioneering work: Ostrom *et al.*, 1978); in Austrian economics, a co-production view of the knowledge commons has emerged (Dekker and Kuchař, 2021, 2023; Goodman and Lehto, 2023). The co-production of cognitive institutions was first conceptualized by Frolov (2022).

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cognitive institutions are (to varying degrees) open to 'co-editing'; they are social constructs that people co-produce on a conversation-by-conversation basis by participating in personal and digital communications. Individuals co-produce various cognitive norms every day, adding new facts, arguments, interpretations, examples, stories, experiences, emotions, imaginings, photos, 'likes', hashtags, and other building blocks to multi-actor discussions. As a result, cognitive institutions are in constant flux. For instance, mis-/disinformation during the COVID-19 pandemic was not simply the result of individuals' choices between 'good' and 'bad' stable mental models. It was a result of the intensive co-production of COVID-related cognitive norms, both productive for society and not, in various communities (Frolov, 2022; Rayamajhee and Paniagua, 2022). Therefore, dynamically co-produced misbeliefs about COVID-19 have been a constantly moving target for policy-makers. In addition, policy interventions were individual-oriented (aimed to influence individuals' decision-making), although community-oriented policy interventions would (possibly or probably) have been more effective at changing behaviour: such interventions could be aimed at influencing the co-production of socially beneficial cognitive norms.

Cognitive institutions not only enable mind-environment interactions, but they also are enablers of their own co-production. For instance, the legal system is a complex cognitive institution, i.e., a system of cognitive norms and normative practices that has the potential to extend individuals' cognitive capabilities and help them solve legal problems (Gallagher and Petracca, 2024). But besides this, the legal system as a cognitive institution provides space for socially extended cognitive processes, as a result of which laws and rules are constantly interpreted about specific, very often ambiguous legal situations. As a result, existing legal ideas, norms, and practices are challenged, adapted, supplemented, recombined, revised, and so on. This is an example of how interacting individuals co-produce cognitive institutions in novel ways.

In economics, there are two clusters of views on the nature of rationality. On the one hand, dominant internalist views assume that rational decisions are the results of individual cognitive abilities and limitations. On the other hand, ecological views assign a decisive role in rational decision-making to environments (Gigerenzer, 2000) or situations (Popper, 1962 [1945]). Post-Northians occupy an 'intermediate' position between these poles. They flatly abandon any universal standard of rationality (i.e., a context-independent cognitive norm that provides optimal mind-environment fit) in favour of the idea of rationality mediated by context-specific, dynamically co-produced cognitive norms (Frolov, 2023): we could call it 'enactive rationality'. Cognitive norms provide affordances for a successful connection with specific environments, which allows people to effectively interpret situations, solve problems, make forecasts, achieve goals, etc. There is a wide range of cognitive norms of rationality and they are all related to specific contexts. In an enactive interpretation, the criterion of rational action is maintenance by the individual of proficient engagement with the current environment (Rolla, 2021). Enactive rationality is the result not so much of personal cognitive abilities and not so much of environmental cues and clues, but of coordinating an individual's cognitive capabilities with environmental affordances, constraints, and resources. Such mind-environment coordination is based on the use of various context-specific cognitive norms. After all, individuals act not directly in response to stimuli, but via cognitive norms, which are interfaces for identifying and interpreting stimuli.

Enactive rationality emphasizes active, relational agency. Individuals matter, however, rational action is action not so much of a single individual mind, but primarily of interacting minds.[4] Individuals are seen as interactants and cognitive norms' co-producers, therefore rational action is immersed in various networks of mind-environment interactions, including social interactions. At the same time, individuals have certain cognitive autonomy, but this is 'precarious autonomy' (De Jaegher, 2013: 23), dependent on interactions with the world, i.e., on individuals' efforts to coordinate specific situations. These interactions are internally dynamic and cannot be described in terms of unambiguously identified problems and unambiguous procedures to solve them (see also Petracca,

[4]In cognitive science, this view is gradually becoming mainstream, displacing the single-mind mindset (Dingemanse *et al.*, 2023).

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2021). People have individual goals and preferences, but they are not clearly defined; rather, they become more specified in the course of unfolding mind-environment interactions.

An enactive rationality approach can critically evaluate many cases of seemingly irrational behaviour. For example, false beliefs, which have become widespread these days, are not always the result of individual incompetence or biased perception of the world. Instead, misbeliefs are cognitive norms adapted to specific environments (social surroundings): they may be incorrect, but they are helpful adaptive tools for social interactions in specific contexts. By thinking through these cognitive norms, people receive interactional benefits, i.e., the benefits from successful mind-environment interactions (including social interactions). Such benefits can be associated both with compliance with community cognitive norms and with emphasizing one's uniqueness through the use of non-mainstream cognitive norms. As a result, individuals are more likely to engage with certain social environments, allowing them to effectively solve problems and achieve cognitive tasks. This is why individuals become co-producers of false beliefs, spending time and effort to strengthen their argumentation base and behave as propagandists for favourite communities, actively spreading misbeliefs associated with them (see also Blancke, 2023; Williams, 2023).[5] In other words, cognitive institutions perform a variety of functions, including non-epistemic ones: they not only convey information that embodies shared experience, but also enable maintaining social relationships, reinforcing social identity, improving reputation and image, social signalling, justifying one's actions, and so forth.

Austrian economics and extended cognition

Austrian economists' views of cognition have always been in opposition to neoclassical rational choice theory and have often been aligned with extended cognition ideas. Moreover, Friedrich Hayek can rightfully be considered one of the first anticipators of enactivism (Di Iorio, 2015).[6] Hayek's views were completely at odds with the Cartesian internalist paradigm, which until recently dominated cognitive science and the philosophy of mind. According to this paradigm, the human mind is an individual and isolated (inside-the-brain) computational system, that creates representations (mental models) of the objective (pre-given) world. On the contrary, Hayek categorically rejected all main parts of internalism. Hayek (1952) objected to representationalism: in his opinion, the human mind is not a representational (world-mirroring), but an interpretative (world-constructing) system. Let's translate Hayek into modern enactivist language: by re-interpreting the world, individuals enact it, i.e., construct the world through performative actions. An example is the understanding of competition as a discovery procedure (Hayek, 2002 [1968]): this is a procedure that allows entrepreneurs to identify previously unknown opportunities for profit by interpreting the market environment and experimenting with different elements of their businesses (product range, prices, technology, personnel, brand, etc.). Hayek de facto rejected the idea of an objective social reality (pre-given world), which people can only reflect and apprehend. In his opinion, social reality exists only in the form of interpreted facts (Madison, 1989). Hayek adhered to a distinctly dynamic view of the mind, emphasizing that personal mental models ('maps' of the world, in Hayek's terms) are constantly changing.

[5]Caplan (2007) proposed a neoclassical explanation for why individuals often rationally choose to be irrational. This view is based on the assumption that individuals have rather stable and well-defined preferences over their beliefs (and misbeliefs). People tend to indulge their misbeliefs more when related (perceived) personal costs are low: this state of affairs is widespread in politics. From an enactive viewpoint, this is an extremely static, internalist, and individual-centred view of cognition, although Caplan's explanations seem very plausible at first glance. At the same time, I share Caplan's idea of the importance of non-epistemic functions of misbeliefs.

[6]Besides Hayek, some economists have also moved implicitly in an enactivist direction. We are talking about a long-term (since the 1960s) project, inspired by Brian Loasby and combining ideas from behavioural economics, Austrian economics, and institutional economics (see, for example, Earl, 1983, 2022; Earl and Potts, 2004; Earl *et al.*, 2017; Loasby, 1999). Although these authors were unaware of the various waves of extended cognition theory, they came to many conclusions that are aligned with enactivism. A clear example is the 'market-assisted choices' concept, which explains how consumers completely or partially outsource decision-making processes to the market institution (Earl *et al.*, 2017).

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An important insight of Austrian economists is the ecological and inclusive notion of rationality as opposed to the internalist theory of instrumental rationality that dominates mainstream economics (this theory presumes that rational individuals seek the best means to satisfy their considered and well-ordered preferences). Since Hayek developed an externalist (in modern terms) theory of mind (Marsh, 2011), it is not surprising that he came to an essentially ecological understanding of rationality. From his point of view, rationality is largely associated not with individual decision-making, but with rational economic order. As societies evolve, institutions take on more and more cognitive functions, creating for people rules (routine ways) of perception and action that are adapted to specific circumstances. Rationality according to Hayek is not an attribute of individual cognition, but a property of interactions between individuals (with local knowledge) and their institutional frameworks. Following the rules is an indispensable condition for the rationality of individual decisions and actions. This allows cognitively limited individuals to quite effectively solve cognitive problems in their everyday economic lives. Hayek attached particular importance to rules of perception, most of which do not exist in explicit (e.g., written or verbalized) form and which are cues and clues for people, integrated into physical and social environments. Different rules of perception allow one to identify and interpret external stimuli in a certain way, select the right responses, and predict future stimuli. Hayek emphasized the complex intertwining of rules governing perception and the rules governing action (Hayek, 2014 [1962]). These views of Hayek anticipate the ideas of extended cognition researchers about cognitive norms and resonate with ecological rationality theory in behavioural economics (see also Rizzo, 2017).

Mario Rizzo and Glen Whitman go even further, completely abandoning the comparison of individual rationality with universal standards. Instead, they focus on the rationality of so-called 'real people' (as opposed to standard homo economicus) who have mutable preferences and ill-defined goals, incomplete and poorly consistent beliefs, and fragmented knowledge. Real people make cognitive errors every day; they hold misbeliefs that provide hidden satisfaction or motivation; they rely on other people, heuristics, and institutional structures to solve cognitive problems (Rizzo and Whitman, 2020). Therefore, Austrian economists propose to stop thinking about human cognition in terms of utility functions (i.e., completeness, consistency, and transitivity of preferences), which will allow us to shift attention from implausible utility-maximizing cognitive actions to utility-improving or utility-seeking ones (Whitman, 2022). The inclusive view of rationality relativizes the notion of rational: this view assumes that rational decisions are both context-specific (namely, ecologically rational) and individual-specific, i.e., dependent on subjective interpretations. Because rationality is understood in the broadest sense possible, people are considered much more rational than behavioural economists portray them as predictably irrational beings.

As the Austrians emphasize, people think and act in complex, ambiguous, and teeming environments. For example, real-world market environments are turbulent and constantly changing; they are intricate and uncertain spaces driven by heterogeneous competing forces and filled with emotion and noise (Stein and Storr, 2023). Markets are flooded with ambiguous signals that require cognitively intensive interpretations (Romero and Storr, 2023). Preferences, goals, and beliefs of individuals are specified and clarified only in real choice situations, during mind-environment interactions. Therefore, rationality should be understood not in terms of consistency of subjective attitudes (e.g., preferences and beliefs) but in terms of effective coupling between individual and environment in certain choice situations. Moreover, the Austrians propose abandoning the static view of rationality norms in favour of a rationality-in-process approach (Rizzo and Whitman, 2018). All kinds of contradictions, biases, and inconsistencies are not markers of irrationality, but genuinely organic parts of rationality as a process of endless attempts by individuals to effectively fit with sophisticated and rapidly changing task environments and choice situations. It may seem that the inclusive rationality concept is too vague and therefore does not allow identifying cognitive errors, but this is not so. Effective coupling means the successful or satisfactory performance of certain cognitive tasks in a certain environment. Cognitive errors exist: they include, for example, not solving a problem or not achieving a goal. However, real people mostly solve cognitive problems that are within their capabilities; in addition, they do not strive to solve these problems perfectly.

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Another key insight of Austrian economists is about active agency interrelated with institutions. As Dekker and Remic (2024) clarify, two internal strands coexist in modern Austrian economics, one based on the (more or less radical) subjectivism, and the other on epistemic institutionalism (Hayekian tradition). For economists of both strands, institutions play an important role in explaining cognitive processes, but these strands have their specifics.

The Hayekian tradition implicitly draws on enactivism and aligns with the third wave of extended cognition research. To take this tradition further into the third wave, Hayek's views must not be interpreted in a reductionist manner. For example, he clearly did not view the market only as a (dispersed) information processor. On the contrary, in my opinion, Hayek implicitly interpreted the market as a cognitive institution that arises in a bottom-up way (through spontaneous order) and provides an ontologically rich enabling infrastructure for a variety of cognitive processes, including very complex ones. The market, like other cognitive institutions, constitutes socially extended cognition, so it not only conveys information (price signals) but above all maintains the co-evolution of practices, habits, routines, cultural models, material artefacts, and other cognitive resources (Petracca and Gallagher, 2020). It was in this spirit that Hayek understood the market, which makes him similar to post-Northian institutional economists.

It is not surprising that the epistemic institutionalist strand of Austrian economics is enthusiastic about the cognitive institutions concept (Dekker, 2022; Dekker and Remic, 2024). Following extended cognition scholars, epistemic institutionalists recognize the need to focus on the interactions between individuals and their institutional, social, and cultural environments. From these interactions, social cognitive systems are formed, full of affordances and opportunities; it is these interactions, not individuals, that generate knowledge. Cognitive institutions that are a good fit for specific environments provide individuals with different cognitive resources, as well as facilitate mutual learning and discovering new capabilities and preferences. Rationality is viewed by epistemic institutionalists primarily as an emergent property of evolving institutional settings, rather than of individual cognitive decisions and strategies. Cognitive biases are not always the outcomes of individuals' cognitive imperfections, but much more often the results of using specific cognitive norms, e.g., cultural lenses (Dekker and Remic, 2024). In general, epistemic institutionalism focuses not on individual cognition, but on cognitive institutions and social cognitive systems. The main danger for this strand is the oversocialized notion of socially extended cognition, when the analysis of mind-environment interactions places the main emphasis (often implicitly) on the social and institutional environment, and downplays the role of individuals.

Dekker and Remic argue that Hayekian Austrian economics, by its core principles, is aligned with the extended cognition paradigm and is absolutely incompatible with the individual-centred view of cognition (the individual cognitivism) that dominates the subjectivist strand. However, individual-centrism as such does not contradict the extended cognition approach. The first and second waves of extended cognition research were individual-centred, although, of course, it was not radical individual cognitivism, i.e., individuals were not considered in isolation from external artefacts and environments, and the content of individuals' thoughts was not interpreted solely in terms of internal mental states (see also Kirchhoff and Kiverstein, 2019). However, even second-wave scholars considered mind-environment couplings from an individualistic perspective. From this point of view, external artefacts or other people augment our cognitive capacities, but do not provide a kind of cognitive symbiosis (Slors, 2020): for example, you can choose a car with the help of a professional expert or on your own; you can find a hotel nearby with or without the app, and so on. And yet we are talking about extended cognition.

Of course, in the subjectivist strand of Austrian economics, some scholars assign little or no role to institutions in cognition. But we should not unduly exaggerate their influence, which is likely to decline steadily. The subjectivist strand is already moving towards socially extended cognition. For instance, epistemic institutionalists consider individual cognition as always coupled with institutional structures within social cognitive systems (Dekker and Remic, 2024). But also in the subjectivist strand, leading scholars interpret individual cognition as a 'two-way interaction between individuals

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and institutions' (Whitman, 2022: 456). Certainly, institutions are understood by subjectivists in the first-wave spirit, as cognition-enabling normative structures (adaptive tools for self-regulation), and cognition is interpreted from an individual-centred point of view. But, I repeat, individual-centrism (if it is not excessive or radical) is not in itself a weak methodology. Any choice situation has a subjective dimension since all individuals describe, interpret, and give meaning to this situation more or less in their own way, based on accumulated personal knowledge and experience. When studying socially extended cognition, we should not completely focus only on the environmental part of mind-environment interactions, ignoring their mental, subjective part (see also Viale *et al.*, 2023), including individual goals, preferences, and interpretations.

In addition, methodological subjectivism and methodological individualism, shared by all Austrian economists of the subjectivist strand, echo the enactivist idea of active (even enactive) agency. According to the Austrian subjectivists, individuals should not be described as passive beings. On the contrary, all people have a lifetime of experience in interpreting the world, so they also have a certain degree of independence from the environment (so-called 'cognitive autonomy', see Di Iorio, 2013). Therefore, individuals 'can actively engage with their choice environment, often changing it in the process' (Whitman, 2022: 456); they are rather active participants in mind-environment interactions. In addition to routinized cognition, real people often create unexpected ways of thinking and acting – e.g., improvising, revising beliefs, experimenting with choices, reframing situations, restructuring environments, interacting with other decision-makers, and so on (Rizzo and Whitman, 2020). The subjectivist strand relies on methodological individualism, but in its institutionalist version, which emphasizes that not only institutions shape individual cognition, but also individuals have active agency and influence on existing institutions (Whitman, 2022). Subjectivists do not mean specifically cognitive institutions, but institutions in the Austrian tradition have always been interpreted mainly in terms of their incentive and coordinative functions. From this starting point, one can take the next step and shift the focus to the cognitive functions of institutions and their subjective side.

Behavioural economics on the way to a social mind

The internalist and individualistic paradigm in cognitive science is very strong and it is on this paradigm that mainstream behavioural economics is based. Behavioural economics is closely associated with the heuristics-and-biases research programme (commonly abbreviated as 'H&B') in the tradition of Daniel Kahneman and Amos Tversky. This programme focuses on irrational reasoning errors and suboptimal cognitive biases, which lead people to systematically deviate from the instrumental rationality ideal (Kahneman, 2011). The H&B programme is the basis of the nudge theory proposed by Thaler and Sunstein (2008). Nudge theorists develop ideas for nudging policies that attempt to improve people's decisions by manipulating choice architecture (the ways choices are presented to individuals) and activating automatic cognitive processes. Since the H&B programme and nudge theory are very intertwined, I propose a new acronym for mainstream behavioural economics: 'HB&N' (i.e., heuristics, biases, and nudges) research programme.

The HB&N programme is highly internalist: it interprets individuals' mental states (e.g., biases) as a consequence of the cognitive imperfections of human beings in comparison with the neoclassical rationality standard. The connection between biases and the specific environments in which biased cognition occurs is most often ignored. HB&N scholars believe that the social environment has an influence only at the moment of decision-making (Frerichs, 2019). As a result, laboratory experiments of behavioural economists remain individual-focused (Whitman, 2022); they also simulate epistemically and institutionally impoverished environments (Dekker and Remic, 2024), ignoring social interactions and cognitive norms. In turn, nudging public policy describes individuals as irrational beings and seeks to manipulate their choices (through the design of decision-making environments) from paternalistic positions, which causes ongoing criticism. It would seem that behavioural economists and extended cognition scholars are going in opposite directions, but this is not entirely true.

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I agree with Dekker and Remic (2024), who argue that behavioural economists still remain captive to the traditional cognitivist model of the human mind. But I want to clarify that the HB&N tradition that came from 'pre-extended' cognitive science is not the only way to develop behavioural economics; two strands arose in it, the ideas of which are aligned with the extended cognition paradigm. These strands are the FFH research programme (which develops Herbert Simon's ideas) and the social mind strand (which develops the HB&N programme).

The FFH programme (an acronym for 'fast-and-frugal heuristics'), led by Gerd Gigerenzer (2000, 2021), is directed against the internalism inherent in the HB&N programme and its fixation on the strong cognitive limitations (irrationality) of individuals. FFH scholars share Simon's (1990) scissors-like view of bounded rationality that is shaped by two 'blades': mental and environmental parts of cognition. Mind–environment 'scissors' metaphorically describe the mutual adaptation of individuals' cognitive capabilities and environmental features. The central concept of the FFH programme is ecological rationality. FFH scholars abandon the utility-maximizing notion of rationality in favour of its broad understanding in terms of success, which implies a wide range of environment-specific criteria for rational actions. The success of problem-solving, decision-making, and any other cognitive processes depends on the specifics of the environment in which they take place. Fast-and-frugal heuristics (simple cognitive norms or rules of thumb), which in the HB&N programme are considered the main causes of cognitive failures, in the FFH programme are interpreted as context-specific adaptive tools for mind-environment fit. Fast-and-frugal heuristics often fit quite well with suitable environments. By empirically proving this fact, FFH scholars successfully oppose the HB&N programme, making its arguments less convincing. For example, many heuristics are widely used in sports and medicine, since with their help athletes and doctors can quickly make quite accurate decisions in situations of uncertainty (Raab and Gigerenzer, 2015).

However, FFH scholars develop a rather narrow notion of ecological rationality, taking into account only universal heuristics (such as recognition heuristic, take-the-best and take-the-first heuristic, 1/N heuristic, and so on) and ignoring idiosyncratic heuristics (Bingham and Eisenhardt, 2014) that are specific or even unique to organizations and communities. I think that the development of the FFH programme is most promising beyond the fast-and-frugal paradigm: this course corresponds to the core idea of the FFH school about a plurality of context-specific normative standards (Berg, 2014). In many contexts, more or less complex cognitive norms are more successful than simple ones. Their empirical analysis can become a promising research field for FFH scholars. Moreover, from the FFH viewpoint, individuals rather passively operate with a fairly static set of universal fast-and-frugal heuristics; such a view resonates only with the first wave of extended cognition research (Petracca, 2021). On the contrary, according to third-wave ideas, individuals actively explore and interpret the environment by testing available cognitive norms and using a highly diverse set of cognitive resources. They try to manipulate their surroundings to gain access to additional affordances and opportunities. They also construct environmental settings together with other actors, including co-producing context-specific cognitive norms. Such an enactive notion of ecological rationality could be a good guide for FFH scholars.

The FFH programme is an alternative to the HB&N programme, but among the HB&N scholars there are many 'heretics'. In my opinion, the 'social mind strand' is an appropriate term for the emerging community of mainstream behavioural economists who are developing externalist, socially situated views of cognition. The social mind strand in the HB&N programme focuses on decision-making influenced by the social environment; it develops socially minded tools for behavioural public policy.

The HB&N programme explores solely acting individual minds, trying to understand inside-the-brain cognitive processes and how their behavioural outcomes can be influenced by policy-makers. According to the HB&N programme, any cognitive errors and imperfections are attributed to individuals much more often than to their social surroundings, institutions, and culture. Understanding of the cognitive mechanisms underlying nudging remains very superficial (see also Hortal, 2023; Nagatsu, 2015). In contrast, the social mind strand rejects the individual-centred approach to cognition and focuses on the 'social mind': a network of interconnected individual minds that are affected by

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material and immaterial properties of the socio-physical environments (Banerjee and Mitra, 2023).[7] The understanding of rationality is also changing: social rationality comes to the fore, which covers socially driven motivating reasons for rational actions, such as social (shared) expectations and preferences, social norms and practices, social signals and feedback, and so forth. The focus of the social mind strand shifts from individual-oriented nudges to social nudges and norm nudges.

Social mind scholars claim that nudges and other behavioural policy interventions must fit the social context (Merrick, 2022). Social nudges are nudges that inform target groups of citizens about others' preferences and social norms, and also about related social incentives and sanctions. From these socially transmitted signals, citizens' other-regarding preferences and social expectations change in the right (from the viewpoint of policy-makers) way, which leads to pro-social behaviour (Van der Linden, 2018).

Although any nudges can be considered as micro-institutional remedies that provide adjustments to irrational behaviours by debiasing individual decision-making (Frerichs, 2019), in the HB&N programme, attention to institutions and, in general, to the social dimension of nudges was minimal until recently. On the contrary, in the social-nudges literature, special attention is paid to norm nudges, i.e., nudges that influence the choices of individuals by appealing to social norms (Bicchieri and Dimant, 2022). Norm nudges are based on a social comparison mechanism: people constantly compare themselves with others, more specifically, with what others typically do and with what others approve or disapprove of (Bicchieri, 2023). One variation of norm nudging is meta-nudging (Dimant and Shalvi, 2022). The idea of meta-nudging emphasizes indirect influence on decision-makers through social influencers – people who have the power to encourage norm-following behaviours. Another variety of norm nudges is nudges based on dynamic norms (Sparkman *et al.*, 2021). Such nudges inform people about changes in social norms, e.g., new behavioural trends and practices; as a result, people can follow the change as such (an updated norm) rather than the existing norm.

Social mind scholars focus on socially situated cognition. In their view, individual behaviours are influenced simultaneously by social factors (e.g., social incentives, preferences, expectations, etc.) and situational factors: a set of dynamic, local circumstances, both social and physical (Smith and Semin, 2004). This view of cognition has an important limitation. The main role in socially situated cognition is played by social situations, and in socially extended cognition – by cognitive institutions. In the first case, we are talking about the situational influence of social factors on individual cognition; in the latter case, we are talking about full-fledged social cognitive systems that are strongly based on shared normativity and dynamic social interactions (including, but not limited to, personal relationships). Therefore, socially situated cognition is an important step towards socially extended cognition. However behavioural economists still have the next steps to take along this path.

Chief among these steps is emphasizing active agency. Standard, namely, manipulative nudges have been subject to powerful and valid criticism (Banerjee *et al.*, 2024; Rizzo and Whitman, 2020). At the same time, alternative approaches have emerged in behavioural economics. The 'nudge plus' approach offers behavioural interventions that combine fast-and-frugal heuristics with deliberation (Banerjee and John, 2024). In turn, the boosting approach is associated with improving the target cognitive capabilities of individuals through changes in their knowledge, habits, skills, etc. (Grüne-Yanoff, 2021; Hertwig and Grüne-Yanoff, 2017). In fact, both nudge plus and boosting approaches are parts of the 'nudging with educating' policy (Hortal, 2020), suggesting that nudges without educational tools and training programmes lock people into an infantile role. Both standard nudges and nudge-related forms of policy interventions (like boosts or 'nudge plus') are individual-centred. Social nudges purport to be a clear exception to this rule. The first examples of nudges emphasizing collective agency already exist: for instance, the norm-nudging strategy 'Working together' proposes to represent norm-nudges in terms of an invitation to join others (a community) to work together

[7]Social mind scholars have abandoned individual-centrism, but they remain in the positions of the first wave of extended cognition research (Banerjee and Mitra, 2023: 4–5). The logical next step for them would be the transition to the third wave and the analysis of social cognitive systems.

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towards a shared goal (Sparkman *et al*., 2021). Another example is the idea of co-design of nudge-plus policies involving actors with multiple forms of expertise (Richardson and John, 2021). From here it's a stone's throw to the idea of co-production of norm nudges as specific cognitive institutions.

Future prospects for the economics of cognitive institutions

Despite the succession of three waves of extended cognition theory in philosophy of mind, in other disciplines, these waves often coexist and co-evolve. This is precisely the situation that is characteristic of modern economics. If first-wave ideas have already become quite widespread, then second-wave and especially third-wave views still remain quite rare. And yet movement in this direction has begun (see Table 1).

What insights from institutional (IE), Austrian (AE), and behavioural (BE) economics can become the basis of a research programme for economic cognitive institutions? The dynamic-interactional notion of cognitive institutions, proposed in post-Northian IE, is a cornerstone of this research programme. The Hayekian strand of AE shares this approach, focusing on the market as a complex cognitive institution and entrepreneurs as agents of cognitive-institutional change. Another fundamental insight of IE is the idea of cognitive institutions as co-produced social constructs, which have both ideational and material dimensions. Inclusive rationality in the subjectivist strand of AE and enactive rationality in IE are essentially very similar concepts that offer an understanding of rational choice as a context-specific process, depending on both subjective interpretations and cognitive institutions. The concept of ecological rationality (developed in the FFH strand of BE) underlies these views, abandoning universal criteria of rational choice. An important insight of the social mind strand of BE is that behavioural interventions can be enhanced or hindered by the influence of the social environment (social cues and relationships, shared beliefs and meanings, and so forth). The idea of socially minded nudges could be the first step towards third-wave behavioural policy.

What does the economics of cognitive institutions add to standard institutional analysis? First, we see a shift from the popular image of institutions as rather rigid objects with constraining functions to their understanding as internally dynamic objects arising from social interactions. Cognitive institutions not only minimize transaction costs by limiting unproductive ways of thinking but above all generate value for their participants. Cognitive institutions provide them with additional cognitive resources – knowledge, orientations, affordances, cues and clues, experiences, and so on. Secondly, cognitive institutions not only provide suitable ways of thinking in specific situations; they are drivers of neuroplasticity. The engaged individuals in these systems of dynamic interactions are neurally changed by their participation. By adapting to cognitive institutions, learning to use them, and accumulating experience in interacting with them, individuals acquire specific cognitive capabilities, adaptive habits of mind, psychological features, and mindsets. Cognition-transforming role of cognitive institutions reminds us that the human being is not so much an organism as it is an 'institutionism' (Commons, 2009 [1934]). Thirdly, cognitive institutions are social constructs, continuously co-produced by multiple heterogeneous actors. Individuals and groups with different values and goals pull cognitive institutions in different directions. Therefore, cognitive institutions are not coherent wholes; they are full of inconsistencies, dissonances, contradictions, conflicts, and power asymmetries.

What do the economics of cognitive institutions add to the standard analysis of economic behaviour? Firstly, it provides an ontologically rich understanding of human actors. Individuals are not only bounded rational; they are also active, creative, and interactive cognizers. Individuals not only passively adapt to the environment, but often try to actively manipulate it. They discover new opportunities and preferences, they search for suitable cognitive norms and adaptive heuristics. Individuals are not just sensitive to social context, not just embedded in institutional settings. They are co-producers of cognitive institutions: individuals constantly influence cognitive norms with their interpretations, evaluations, argumentations, and criticisms. Secondly, rational decision-making is closely related to cognitive institutions. Yes, rational decisions are made by individuals, but they constantly take advantage of the

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Table 1. Institutional, Austrian, and behavioural economics on extended cognition

		Austrian economics		Behavioural economics	
	Post-Northian institutional economics	The epistemic institutionalist strand	The subjectivist strand	The HB&N programme (the social mind strand)	The FFH programme
Wave of extended cognition theory	Explicitly follows the third wave	Aligns with the third wave	Aligns with the second wave	Aligns with the first wave	Aligns with the first wave
Notion of cognition	Socially extended cognition	Socially extended cognition	Individual-centred, socially situated cognition	Individual-centred, socially situated cognition	Individual-centred, bounded rational cognition
Focus of analysis	Focus on cognitive institutions that underlie social cognitive systems	Focus on market cognitive systems and cognitive institutions	Focus on mind-environment couplings	Focus on individual cognition influenced by social situations	Focus on individual cognition mediated by heuristics
The role of institutions in cognition	Cognitive institutions play enabling, constituting, and cognition-transforming roles	Cognitive institutions enable cognitive processes and systems	Institutions are enablers of cognitive processes	Social nudges and norm nudges are institutional remedies for cognition	Simple cognitive rules are context-specific adaptive tools for cognition
View of the human actor	Active (probing) and interacting cognizer; co-producer of cognitive institutions	Active cognizer embedded in institutional settings and social interactions	Active, rather autonomous, creative cognizer	Bounded rational actor sensitive to social influence and context	Bounded rational, intuitive, and adaptive person
Guiding cognitive activity	Cognitive norm-taking and norm-making	Searching for the effective mind-environment coupling	Discovering new opportunities and preferences	Linking individual and social reasons for action	Searching for suitable fast-and-frugal heuristics
Notion of rationality	Enactive rationality mediated by dynamically co-produced, context-specific cognitive norms	Institutionally driven rationality	Inclusive (context- and individual-specific) rationality	Social rationality (including social expectations, motives, preferences, etc.)	Ecological rationality mediated by fast-and-frugal heuristics
Main cognitive problem	The fitness of cognitive institutions to their environments	Dispersion of knowledge and a deficit of relevant market information	Individual decision-making in market environments	Creation of socially minded nudges to improve individual behaviours	Individual problem-solving in various environments
Notion of environment	Real-world messy environments	Teeming and ambiguous market environments		Heterogeneous social environments	Real-world complex environments

(*Continued*)

Table 1. (*Continued.*)

		Austrian economics		Behavioural economics	
	Post-Northian institutional economics	The epistemic institutionalist strand	The subjectivist strand	The HB&N programme (the social mind strand)	The FFH programme
Policy implications	Co-production of cognitive institutions	Co-production of knowledge, rules, and practices in knowledge communities Policies for maintaining bottom-up institutions		Social nudges, norm nudges, meta-nudging	Development of task- and context-specific heuristics
Guiding metaphor	Shared mental processes	Spontaneous order		Social mind	Environments that make us smart

Note: 'Shared mental processes' is the first definition of economic cognitive institutions (Petracca and Gallagher, 2020), an alternative to North's 'shared mental models'. 'Spontaneous order' is one of the core theoretical ideas of Hayek. 'Environments that make us smart' is the title of one of the most famous articles on fast-and-frugal heuristics (Todd and Gigerenzer, 2007).

opportunities and affordances offered by cognitive institutions. Making a rational decision means, first of all, choosing a suitable cognitive norm for interpreting the choice situation, i.e., activating the associated dynamic system of social relations, which provides additional cognitive resources for successfully solving cognitive problems. Thirdly, emphasis on mind-environment interactions is important for understanding economic behaviour, since economic (e.g., market) environments are messy, teeming, heterogeneous, and ambiguous. In this sense, sense-making is a much more fundamental process than decision-making. Sense-making is the interpretation of ill-defined situations through cognitive norms related to the individual's (ill-defined) preferences and goals. Cognitive institutions strongly matter in an economic world full of ill-defined problems.

Three-wave logic allows us to see a general perspective – the transition of economists to third-wave ideas and their active use both in theoretical and empirical research and in policy recommendations. I suggest briefly discussing a preliminary research agenda for the economics of cognitive institutions. This agenda covers three main blocks.

First of all, regarding theoretical research, we should develop a more sophisticated notion of cognitive institutions. We should move beyond the one-sided positive/optimistic view of cognitive institutions that ignores their negative forms and effects. Cognitive institutions are often ambiguous, fragmented, internally conflicting, ineffective, etc.; they often enable individually and/or socially destructive cognitive processes and behaviours[8]. We should overcome the weak attention of third-wave scholars to the power dimension of cognitive institutions and, in particular, to bargaining power. Numerous cognitive institutions are imposed, i.e., they are chosen by people not freely, but under the pressure of dominant groups (examples are ideologies and other socially enforced beliefs). We should analyse the role of both transaction costs and cooperative/interactional benefits (both economic and non-economic) in the choice between alternative cognitive institutions. We need to take into account that such a choice is realized by heterogeneous brain-body-environment mechanisms that vary between individuals, institutions, and choice situations.

We should also rethink the functionalist understanding of cognitive institutions as problem-solving cognitive mechanisms in favour of more complex explanations that take into account their unconscious, embodied, relational, symbolic, ideological, and other (often messy) properties.[9] For instance, the market solves consumers' cognitive problems, but (as some economists would add) solves them within the ideologically imposed cognitive norms of overconsumption. We should also include in the analysis cognitive institutions that enable submerged (affective, emotional, intuitive) aspects of extended cognitive processes[10]. We should add a temporal dimension to the spatial (environmental) dimension of cognitive institutions. Cognitive institutions are distributed not only across environments but also over time. Therefore, future-making and re-interpretation of the past should be rethought as processes of co-production of cognitive norms that allow us to navigate in the time continuum. Imagination is underestimated in economics, so we should pay special attention to institutional imaginaries – imagined institutions and imaginative features of existing institutions. Such imaginaries (they range from metaphors to utopias) are cognitive norms that enable our predictions of the institutional future. Finally, we should make cognitive-institutional evolution a priority object of analysis, focusing on both path dependence and path creation. These and other ideas arising from the third-wave approach will allow further development of a nuanced and anti-reductionist views of cognitive institutions.

Regarding applied empirical work, mixed methodological approaches that examine socially extended cognition are promising. We are talking, in particular, about the combination, on the one hand, of experiments with naturalistic choice environments and, on the other hand, of

[8]A good starting point for this issue is provided in Gallagher (2013), Maiese (2018), Gallagher and Petracca (2024), and Frolov (2023, 2024).

[9]See the first statement of this problem in De Jaegher, 2013.

[10]We could rely on works that are mostly unknown to economists (e.g., Colombetti, 2015; Colombetti and Zavala, 2019; Gallagher and Bower, 2014; Krueger and Osler, 2019).

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quasi-experimental and non-experimental methods. Of course, we should understand that behavioural economists are, in principle, ready to conduct any experiments, including complex and expensive field experiments, but their resources are often limited (Earl, 2022). Therefore, the main thing is that in economics, the very idea of transition to a third-wave mindset becomes widespread, which will allow the creation of interdisciplinary collaborations and empirical investigation of cognitive institutions in novel ways. Experimental research on socially extended cognition should go beyond simple laboratory studies and develop sophisticated methods, techniques, and models for studying rich forms of cognition in ecologically valid settings.[11] We are talking, in particular, about collecting 'big data' on real people's cognition in real ecological contexts via different devices, ranging from everyday devices (like smartphones) to tracking devices (such as wearable biosensors and VR headsets). Empirical analysis of enactive and inclusive rationality 'in the wild' is also a promising research field.[12] Case studies on economic cognitive institutions can also become a valuable source for their deeper understanding. These could be historical cases (such as in Greif and Mokyr, 2017). In addition, cognitive institutions strongly matter in high-tech digital environments, for example, in blockchain ecosystems and metaverses (Frolov, 2024; Petracca and Gallagher, 2024): there are a lot of interesting cases in this field.

Finally, the policy implications that follow from the proposed research programme are primarily related to the co-production of cognitive institutions: citizens' active engagement in the design and promotion of nudges and other cognitive norms that activate prosocial cognition and behaviour. Post-Northians are moving in this direction, studying cognitive institutions for polycentric governance. There is a huge amount of research on the co-production of norms and practices in knowledge communities; the contribution of the Austrians to this strand is very significant. These research lines need to be much more widely developed. In behavioural economics, so far only norm-nudging resonates with the co-production approach. But both policy-oriented ideas of the FFH programme (related to developing task- and context-specific heuristics) and the social-nudges programme may in the future develop in line with the co-production approach. The main features of this approach are to emphasize active agency and shift attention from individual-focused behavioural interventions to interventions oriented towards social interactions in various communities. As a result, the quality of policy-making could increase: for instance, co-produced nudges, as opposed to standard manipulative nudges, can be both effective and autonomy-preserving.[13] We must move far beyond the idea that prosocial decision-making can be influenced by universal methods and without citizens' participation.

The transition from the first and second waves to the third wave can be quite a difficult path. This is due to a change in behavioural assumptions, which are the core elements of economic methodologies. Individualistic concepts of cognition are deeply rooted and it will not be easy to 'uproot' them. Even in cognitive science, individual-centred views are overcome with great difficulty. However, the path to the third wave may well lie through methodological individualism, because the first and second waves of extended cognition theory were individual-centred. There are significant differences between the second (individualistic) and third (dynamic-interactional) waves, but there is no bottomless abyss. I believe that even mainstream economists could quite easily 'upgrade' their behavioural assumptions to the second wave. This would allow them to make their experiments and formal models much more realistic and would pave the way for a third wave in the future. In turn, both behavioural economists and Austrian subjectivists could move towards the third wave while remaining (non-radical) methodological individualists. After all, socially extended cognition is not a sort of methodological collectivism (or holism): on the contrary, it brings active agency to the fore.

[11]See discussion about the potential and limitations of such new methods for cognitive science in Cavallo and Casartelli, 2023; Maselli *et al.*, 2023.

[12]It is important not to lose the body as part of brain-body-world interactions that result in rational decisions (see Mastrogiorgio and Petracca, 2016).

[13]By co-produced nudges, I mean participatory nudges that are created and promoted by members of the communities that the nudges target. Co-production of nudges also includes training and information sharing within communities.

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My prediction is that economists will increasingly turn to extended cognition theories and, in general, to externalist views of cognition in the search for new ideas about the cognitive foundations of institutions and behaviour. Extended cognition ideas will gradually cause less and less controversy and will become part of the standard toolboxes of economic schools. I think that fragmentation will increase as economists try to combine increasingly diverse (and cross-wave) extended cognition approaches with existing approaches and methods. And yet I believe that the third-wave narrative will attract the attention of most economists to the study of cognitive institutions, and therefore to an enactive view of (socially extended) cognition. In any case, the growth of diversity of extended cognition ideas in economics should not be perceived as a problem: many disciplines are successfully and rapidly developing without an overarching paradigm, such as neuroscience or theoretical physics.

Externalist approaches to cognition are a new paradigm that is replacing internalism in all cognitive disciplines – from neuroscience and psychology to linguistics and computer science. Therefore, economists will gradually move towards this new paradigm one way or another. We can speed up this paradigm shift and make it more purposeful, i.e., oriented towards third-wave (enactive) ideas about cognitive institutions.

Conclusion

Ideas Of extended cognition are in the air. It is not surprising that despite the dominance of internalist views of cognition in economics, elements of externalist (and even enactivist) approaches, directly or implicitly, are increasingly beginning to be used by economists. There are already numerous overlapping ideas and conceptual connections that can be interpreted as an emerging research perspective. However, institutional, Austrian, behavioural, and other economists still largely work in epistemic bubbles, behind the comfortable walls of school boundaries. Academic cognitive rules and practices in economics stimulate its development towards fragmented (rather than engaged) pluralism. Therefore, the paradigm shift from internalism to externalism (and further to the third-wave view of extended cognition) requires a shared research agenda for economic cognitive institutions, which can stimulate interdisciplinary connections, collaborations, and projects.

We need to realize that the extended cognition paradigm is the path that economics is already following, and this path involves moving towards the third wave. On this path, we can become the vanguard among all social sciences in the study of the human mind. Moreover, I believe that economists can help philosophers of mind and cognitive scientists greatly improve knowledge about socially extended cognition because we have a deep understanding of institutions and institutional change. It's just time for us to focus on cognitive institutions.

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