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Attribute Substitution, Counterfactual Thinking, and Heterodox Economics

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Abstract: This paper examines how attribute substitution (AS), central to the psychology of choice and behavioral economic reasoning, can be understood when combined with counterfactual thinking (CFT), often called 'what if' or 'if only' thinking, and how their combination creates important opportunities for the seeing heterodox economics as a single research program alternative to mainstream economics. The first section of the paper discusses AS, CFT, and what a AS-CFT behavioral framework involves, and then emphasizes how this framework departs from fundamental assumptions mainstream rational choice theory employs. The second section reviews the foundations of behavioral thinking regarding AS, describes what it involves when it includes attention to CFT, distinguishes between more automatic and more reflective types of behavioral adjustment. It notes that heterodox economics has generally emphasized ecological rationality and bounded rationality in its use of AS. The third section then discusses how six prominent heterodox approaches can each be understood to draw on this combination of AS and CFT, and how this represents common ground for a shared critique of the mainstream economic approach. What distinguishes them is how they differ regarding the weight and emphasis placed on more automatic versus more reflective types of behavioral adjustment. The fourth section argues that within this shared framework these different heterodox approaches practice a division of labor in how they address different aspects of economic life understood in behavioral and counterfactual terms.

Keywords: attribute substitution, counterfactual thinking, adjustment behavior, automatic versus reflective, heterodox economics

JEL codes: A12, A13, B41, D90

1 An attribute substitution-counterfactual thinking behavioral framework

The approach in this paper has roots in the psychology of attribute substitution (AS) as based on attribution theory and attributional inference. In the recent literature, this theory has taken the form of a reflexion-reflection model (Lieberman, Gaunt, Gilbert and Trope, 2002). AS

bears similarities to the heuristics and biases program, especially to the simulation and fluency heuristics, and to Daniel Kahneman's utilization of this term as a shortcut for variable heuristics. Both attribution theory and the heuristics concept have important connections to counterfactual thinking (CFT) or 'what if' and 'if only' thinking (Williams et. al., 1996).

The approach in the paper also has roots in twentieth century economics in implicit use of attribute substitution thinking in the work of eminent economists like Keynes, Shackle and Hayek. Rutherford (1988) also connects attribution theory to Simon's emphasis on variable "heuristic search" (Simon, 1980) in bounded rationality (Koutsobinas, 2021). The connection between AS and CFT has been made recently by Davis and Koutsobinas (2021) as a useful process for understanding ecological rationality. This paper expands on these connections by showing how an AS-CFT framework can help to integrate new branches in behavioral reasoning in modern heterodox economics.

Behavioral reasoning, especially as developed in regard to AS, has impacted economics in many ways. Much attention has been devoted to its critique of mainstream rational choice, but also relevant, if less explored, is the importance of behavioral reasoning to heterodox economics. This lesser attention may be influenced by the fact that heterodox economics is made up of a collection of different approaches whose linkages and connections have not been a primary concern of proponents of those different approaches. To the extent that these different approaches take up behavioral arguments, they tend to do so in different ways specific to their different research goals. We argue in this paper, then, that one potential unifying theme for how behavioral reasoning matters to them all concerns how behavioral reasoning relates to the connection between counterfactual thinking and attribute substitution.

AS is a cognitive process by which people simplify complex choice problems by substituting the attributes of a more manageable decision heuristic for the less manageable aspects of those complex choices. A key dimension of this, we thus argue, is how people often think counterfactually or contrary to the facts at hand in terms of what can be called possible or conjectured facts. Thus, if the known facts in a given complex choice problem are interpreted as implying a set of possible or conjectured facts, these additional kinds of facts can be used to frame that complex choice problem in such a way as to utilize a decision heuristic that makes that problem more manageable.

For example, one well-recognized type of AS is the fluency heuristic whereby an inference about a target construct depends on there being a noticeable but theoretically irrelevant cue regarding how a choice problem could be addressed (Kahneman, 2003). The cue generates an optimistic sentiment and feeling of confidence regarding interpreting employing the target construct through substituting a decision heuristic (Thompson and Morsanyi, 2012). The cue may be many things: other known facts that might not immediately seem relevant, but also possible or conjectured facts that might conceivably also bear on the choice problem. Complex choice problems, it should be emphasized, have an especially open-ended nature in that it is unclear what they include and don't include. AS not only manages this complexity by reframing the nature of these problems, but also by reframing the nature of the evidence, or what the facts are and might be that enter into people's need to make choices.

More broadly, CFT as what is called 'what if' or 'if only' thinking, involves a form of reasoning about alternative behavioral possibilities regarding past and future events, or about what might have happened or what might yet happen had things been different (Davis, 2018). It has not been neglected in psychology, as we will show, but has not been systematically incorporated into the behavioral reasoning imported into economics, either in mainstream or heterodox economics. Thus, our goal in this paper is to show that incorporating CFT into behavioral economic thinking can both provide new perspectives on the way AS is applied, bring out unrecognized links between different heterodox economic approaches that employ behavioral reasoning, and also shows an important way in which heterodox economics as a whole differs from mainstream economics.

Note why, then, behavioral thinking, as has been imported into mainstream economics, has neglected CFT. Mainstream economics uses the Bayesian evidence-updating to model how individuals employ information. What differentiates standard rationality theory and mainstream behavioral economics is then how effectively agents update their priors in forming hypotheses regarding grounds for choice. AS, as most mainstream behavioral economists understand it, involves interpretations of evidence that a purely rational individual would not make. Thus, the issue of what counts as a fact has largely been put aside, and behavioral economics is often seen to be simply an imperfect form of rational choice theory, where attention instead ultimately rests on examining how we might identify what individuals' 'true preferences' are (Bernheim and Rangel, 2007, 2008), thus getting to the "inner rational agent" inhabiting "psychological shell" individuals occupy (Infante *et al*., 2015).

Note also that this understanding presupposes classical propositional logic and in particular the *modus ponens* rule from which we infer true consequents from true antecedents.[1] It accordingly treats as a fallacy reasoning that affirms the consequent, or affirming the truth of the antecedent from the truth of the consequent.[2] It is interesting, then, to see why affirming the consequent is usually seen to be a fallacy. Quite reasonably, if something is true, and is taken to be a consequence of something that brought it about, then any number of possible antecedents could be responsible, so we are not entitled to infer (or affirm) one particular antecedent to explain it. Not only, then, do we ordinarily resist engaging in this kind of reasoning, but, from the point of view of mainstream economics, this also disrupts its reliance on Bayesian reasoning, which starts with true priors and systematically and predictably updates our stock of true information on this basis.

Consider, however, an example of this form of fallacious reasoning where not only do we move from a true consequent to an affirmation of an antecedent, but we also say that the antecedent is false. For example:

If Smith studied more, her exam score would not have been so poor. (1)

Here the antecedent is false – Smith did not study more – but if her exam score was indeed poor, the consequent is true. This is an instance of counterfactual thinking whereby we

[1] If *p*, then *q*, and *p* is true, then *q* is true.
[2] If *p*, then *q*, and *q* is true, then *p* is true.

consider possibilities as the basis for our inferences. Those possibilities have a close relation to facts. In this example, it is taken to be a fact that studying improves exam performance. Thus, the non-fact – that Smith did not study more – is closely related to a fact. In effect, facts leverage counterfactual exploration of what might be, or in this case, might have been, facts. So though (1) exhibits what is classically considered fallacious reasoning, as an inference most people would regard it as reasonable.

This argument may seem to fall below the standards of good epistemology for science, but we should remember that science aims to describe the world, and whether people behave rationally or logically as we understand what this involves is a normative matter that is distinct from this descriptive task. Perhaps, then, what really discourages some researchers from taking CFT seriously is that the reach of counterfactuals seems in many cases patently fanciful, and thus CFT is best avoided altogether. For example:

If Rome hadn't fallen, all history would have been different. (2)

In this case, the possibilities are so vast that it seems irrational to try to leverage non-facts to infer possible facts. The possibilities, we might say, have no close relation to facts, so the leveraging rationale is not practical. Yet in response to this, where people do engage in CFT this problem is commonly taken into account. If the boundary between highly unrealistic and realistic possibilities is hard to identify, people nonetheless are often prepared to reason in terms of more realistic possibilities. In psychology, CFT this accordingly has been investigated in connection with 'close counterfactuals' or possibilities that almost or might well have occurred had things only been a little different, as in the case of example (1) regarding studying for an exam (Kahneman and Varey, 1990; see also Kahneman and Tversky, 1982). What research on 'close counterfactuals' shows is that people's CFT is governed by implicit norms and rules that allow people to distinguish cases like (1) from cases like (2). Indeed, that such norms rules and practices exist has long been well-known outside psychology since as we are all know people regularly resort to CFT in the widespread reliance on the subjunctive mode in natural languages.

2 AS, automatic vs. reflective adjustment, and heterodox economics

Kahneman's universal use of the concept of attribute substitution (AS) emphasized in his 2002 Nobel award (Kahneman, 2002; Kahneman, 2003) as a replacement of variable heuristics signifies a crucial moment in the development of the celebrated heuristics and biases program in behavioural economics, because it highlighted the human psychology theory of attribution theory with its emphasis on attributional inference. While AS is an all-encompassing mechanism which underlies the variable discovery of any heuristic, it is also often discussed in terms of specific heuristics like the fluency heuristic noted above. What this involves is a particular kind of inference about a target reaction that relates to situational cues such as sentiment or ease of processing (Hertwig et al. 2008; Thompson and Morsanyi, 2012). Often emphasized is how a feeling of rightness principle is similar to judgments of confidence (Thompson 2009, 2010).

Left unaddressed in this framework, however, is the nature and character of the adjustment process involved itself. Does it tend to be highly automatic, more reflective and considered, or even initially automatic and afterwards reflective? Does adjustment depend on the kind of situation that agents face? Heterodox behavioral reasoning has often emphasized the more automatic response, and has especially drawn on ecological rationality (ER) behavioral thinking and the fast and frugal heuristics view of Gerd Gigerenzer and his colleagues (e.g., Gigerenzer and Todd, 1999; see Altman, 2017; Baddeley, 2017)).[3] That approach has the advantage that it offers a practical account of bounded rationality, and relates to the seminal work of Herbert Simon (1955; 1972). As the term 'ecological' implies, this approach emphasizes the situational nature of decision-making, showing how the use of heuristics in certain situations serve the decision-maker better than generic rational calculation methods and probabilistic measures.

For example, the relatively higher accuracy of the take-the-best heuristic stressed by proponents of ER, as compared to other models, depends on the: (i) scarce or low quality of available information, (ii) high dispersion of validities of available or discovered attributes, and (iii) presence of options dominating other options, including the case of cumulative domination. While empirical research on ER has gone far to show that certain heuristics work better than others, less has been done about attribute discovery to identify dispersion of attributes, or how option discovery facilitates the categorization of areas of domination. We think, then, that linking AS and CFT has something to offer in this regard.

One way, then, that AS involves CFT is that the latter facilitates option discovery in regard to how what are called 'prefactuals' play a role in causal reasoning. Prefactuals in behavioral reasoning concerns what is 'prior to facts'', yet involves too what we suppose might nonetheless be the case – in effect, one kind of possible or conjectured set of facts (Davis and Koutsobinas, 2021). They are important, for example, in connection with the simulation heuristic in playing a role in a reflection stage of thinking in which alternatives and disablers, or ways of setting aside some information, are formulated. Alternatives are discovered through assimilation effects, while disablers are activated through contrast effects. Overall, then, through heuristics such as assimilation, simulation and fluency, AS is involved in this case in what we thus characterize as a more reflective-inductive CFT dimension of causal reasoning concerning the evaluation of information for its potential factual-causal potential. This dimension can then function as a precondition for a more automatic sort of response. Thus, our emphasis is not on the well-known dual-mode view of decision-making, that people may sometimes use automatic thinking and at other times deliberation and reflective thinking (see for example, Evans, 2006), rather than on the existence of the AS-CFT connection (Davis and Koutsobinas, 2021), which serves as a mechanism of interaction between automatic and reflective forms of reasoning.

AS based on attribution theory offers a broad platform for the integration of traditional heterodoxy. If mainstream economics has tended to rely almost exclusively on the Kahneman-Tversky heuristics and biases behavioral program, proponents of traditional heterodoxy, who oppose the importance of perfect rationality in economics, have rejected interpreting behavioral heuristics as this program has been developed with perfect rationality

[3] For an alternative view of ecological rationality, see Smith (2003).

as a benchmark, and are more keen to adopt the ER approach as an alternative strategy for explaining the economy. They are naturally more at ease adopting the pure psychological theory of attribution theory, which does not build its assumptions in reference to the rationality debate. Yet they are also naturally more at ease making uncertainty central to this thinking, and uncertainty is the basis of CFT.

AS when combined with CFT, we believe, offers a more sophisticated and inclusive analysis of behaviour, not only because it explains how different attributes emerge as being more relevant for some people in some contexts, but also because this principle can be extended to explain how the different types of uncertainty economic agents encounter in different contexts affects how they make use of the different attributes they employ. Our view is that the way to do this is to combine the main emphasis in the ER approach on automatic adjustment with additional attention to a more reflective-inductive dimension of causal reasoning under conditions of uncertainty to thereby further strengthen heterodoxy's use of behavioral reasoning.

Take as an illustration how AS has been shown to be relevant in Keynes's analysis of expectations in situations of radical uncertainty (Koutsobinas, 2015). This form of uncertainty is a critical foundation for Post-Keynesian economics, and after the Great Recession certain notions usually related to radical uncertainty such as Keynes's animal spirits have become focal in some mainstream macroeconomic analysis (see for example, Akerlof and Shiller, 2009; De Grauwe, 2012; Farmer, 2011). If Post-Keynesian thinking on radical uncertainty goes farther than what is compatible with mainstream macroeconomics, as suggested by Kay and King (2020), arguing in favour of "good enough" and flexible decisions based on narratives with strong relevant evidence is better and more useful than pseudo-optimal options (that is, optimal options with low predictive value) based on probability. Yet how this can be done requires that we focus on how agents respond to the ways uncertainty affects them.

3 The AS-CFT approach, behavioral reasoning, and heterodox economics

The methodological platform of behavioral reasoning offers a broader, advantageous alternative to the mainstream pathological utilization of heuristics strategy, and is one means of linking the diverse approaches of traditional heterodoxy. As Koutsobinas (2021) argues, there are obvious opportunities which can be exploited in the border terrain between those schools that can even provide a path towards an integration of their behavioural foundations. We thus distinguish and briefly survey six prominent heterodox schools, arguing that they can each be understood to all employ the main elements of a AS-CFT approach.

3.1 The original institutional economics

In original or old institutional economics (OIE) knowledge under fundamental uncertainty is a limited guide to action and, therefore, is supplemented by forces such as emotions and habits, which are key to the OIE understanding of human psychology. Norms, rules, and institutions then evolve as structures that channel and stabilize these behavioral responses to uncertainty. Yet they do so in different ways that allow for both automatic and reflective human psychological processes at different levels of consciousness (Hodgson, 1988). On the

one hand, then, the OIE agenda investigates various kinds of reasonable action, not unlike satisficing, in which rule-following is emphasized (Langlois, 1986). On the other hand, the OIE approach also underlines automatic responses when habits, feelings, the social compulsion of customs that compel uniformity (Commons, 1959; Jensen, 1988) and hidden persuaders are involved (Hodson, 2003). Both types of responses operate in connection with Veblenian blind impulses and instinctive proclivities related to workmanship, curiosity, parental tendency, acquisition, self-regard and habituation that produce "speculative" and "institutional" knowledge (Jensen, 1988) together with "matter-of-fact" or "technological," knowledge.

Besides habits, rules are especially important in OIE theorizing (Hodgson, 1997). Rules often do not apply smoothly to new situations, and this triggers counterfactual thinking regarding how they might be applied. A transformative deliberation can then take place, and rules acquire a certain degree of fluidity (Morgan and Olsen, 2011). Reflective reasoning is facilitated by working with worst-case scenarios, that is, thinking "through possible negative outcomes" and "imagining what could go wrong". Those thoughts involve preventive mental simulation, "defensive pessimism," and "prefactual thinking (Norem and Chang, 2002). Finally, there is an acknowledgment that Sugden's (2000) "credible counterfactual worlds" idea gives "some warrant for making inductive inferences from model to the real world" (Hodgson, 2009). As in the case of Schelling's (1969) ethnic segregation model, decisions might not result from causal factors that may be presumed at first sight but from ones that are initially neglected, and surface through a causal mechanism (Hodgson, 2009) based on mental simulation.

3.2 Post-Keynesian economics

Keynes's theory of fundamental or radical uncertainty (1921; 1930; 1936) relies heavily on the dynamics of human psychology. Those include for example emotions (i.e., animal spirits), confidence, and expectations impacted by social influence processes. Other psychological traits that are considered within the context of Keynes's theory of fundamental uncertainty developed mainly in the subsequent Post Keynesian theory include habits as well as surprise and creativity. Keynes did not analyse explicitly the impact of creativity in decision-making. However, this psychological reaction features prominently in the subsequent Post Keynesian literature on expectations under uncertainty. For example, Shackle's theory of creative choice under uncertainty (1967; 1972; 1979) includes surprise and imagination.

Moreover, inferential judgment and attributional inference (Koutsobinas, 2004; 2008; 2014) are important in Keynes's thinking. For example, in connection with Keynes's concept of convention, decision-makers assume that current information will continue indefinitely except in periods of important changes (Keynes, 1936, p. 152). In the inferential process, individuals infer that they know the target information based on partial current information. A similar line of argument with respect to inferential judgment impacted by social influence as in the case of convergence of individual estimates to "average opinion" in the infamous beauty contest example discussed by Keynes (1936, p. 156). In such situations, investors presume or infer that they know the target information for their own estimates based on the information that is inherent in the prevailing view in the market.

Although there is no explicit discussion of CFT, according to Keynes's theory the formation and updating of expectations is influenced by the state of confidence and the evidential weight of information, or the weight of argument (Keynes, 1921). Therefore, counterfactual causal claims, which emerge or may be considered incorrect require revision as new evidence is utilized and evaluated. The emphasis on imagination and creativity in the construction of counterfactuals promotes scenario thinking and the identification of alternatives, which decision-makers use to adjust their expectations. Therefore, reflective reasoning influenced by the state of confidence and evidential weight uses in practice counterfactuals. This happens to open minds, raise questions, consider alternative solutions, and action plans and possibly to consider more strongly initially unfamiliar options (DeMartino, 2020).

3.3 Austrian economics

In Austrian economics, Hayek's work on cognitive theory has been an important reference for several alternative explanations of his theory on expectations and decision-making (see for example, Butos, 2010; Arena and Larrouy, 2015). This perspective has been utilized to develop a theory of ''Hayekian economic expectations'' (Butos and Koppl, 1993), which embodies learning, the formulation of conjectures, self-corrective routines and adaptive behaviour in a complex environment. This framework is thought to provide an alternative to the Keynesian perspective of expectations in radical uncertainty based on elements from a "Hayekian" perspective for the purpose of supporting Austrian approaches to macroeconomics (Butos and Koppl, 1997; Koppl and Luther, 2012). As a research agenda, it has been criticized with the claim that while Hayek's cognitive theory is useful, it is not fundamental for the analysis of his economics, or of Austrian economics (D' Amico and Boettke, 2010). Nevertheless, Hayek's approach has made sense even in an evolutionary and behavioural framework, which requires only ''good enough'' responses (Earl, 2013). For this reason, Hayek's cognitive theory has been viewed as being supportive of a more realistic theory of agency (Earl and Littleboy, 2014).

Austrian economics are set in a framework of a complex world influenced by Knightian uncertainty, with tacit knowledge and conjunctural causation. Moss (1975) has emphasized the classic imaginary constructions have directed the Austrian school although the contemporary emphasis now is more on empirical and historical approaches. Boettke and Prychitko (1994) consider the "method of imaginary constructions" as one of the main foundations of the Austrian school as substantial and sound information about the economy and social organization can be found through imagination.

Austrians are comparativists through the utilization of "comparative-counterfactual analytics" threads involving conjectural histories, spontaneous orders and empirical cases, which make use of counterfactuals and thought experiments (Aligica and Evans, 2009). Those forms of reflective reasoning are cognitive strategies that compare historical information, social realities and grand thought discoveries through the power of counterfactual analysis so that comparative inquiry cannot be easily reduced in mechanistic types of evaluation. Counterfactual reasoning is considered as a prerequisite for any form of learning from history (Tetlock and Belkin 1996). On the other hand, comparative analysis contrasts to cognitive biases and illusions, to which Austrian economics are attuned such as those involving bureaucrats and regulation intervention (Muramatsu & Barbieri, 2017).

3.4 Evolutionary economics

Evolutionary economics, both in its mainstream and heterodox forms is influenced mainly by evolutionary biology. Yet, within evolutionary economics, there are advocates of a closer link between evolutionary economics and evolutionary psychology and anthropology. The application of evolutionary psychology principles to economics has been used to explain inconsistencies in rational choice theory, including utility theory, group differences in risk-taking and a poor intuitive understanding of the fast changes underlying global market economy today. Modern evolutionary psychology gives strong support to the ideas of James, Veblen and others concerning the primacy of habits (Hodgson, 1998).

The strong impact of evolutionary biology implies a tendency for naturalistic explanations of human behavior in evolutionary psychology (Stoelhorst, 2014) Evolutionary psychology supports the idea that most of human behaviour is genetically programmed, mainly through innate Darwinian cognitive modules (Barkow, Cosmides, & Tooby, 1992). and has been highly controversial (Fodor, 2001).

The evolutionary psychology debate has involved mainstream psychologists, who work on the analysis of different systems of cognition and believe that evolutionary psychologists seek to undermine the impact of general purpose cognition (Evans, 2006). Evolutionary psychology proposes domain-specific modules and heritable individual variances in intelligence (Tooby & Cosmides, 1992). While the predominant approach in evolutionary psychology supports the evolutionary modularity theory of the mind and appears to argue against dual-process theory and a general reasoning system (e.g. Cosmides, 1989), there are also influential evolutionary opinions that support the development of general reasoning (Evans, 2006). In the modularity framework, there is little role for deliberate thought and reflective reasoning although it has been conceded (see for example, Cosmides & Tooby, 2000) that humans have unique abilities to apply their reasoning across a broad range of domains (Evans, 2006).

The evolutionary psychology vs. standard psychology debate brings forth the question of differences between evolutionary rationality and instrumental rationality. Those alternative forms are achieved by habits and procedural learning applied in the early history of our species and in the past history of our individual lives respectively. Evolutionary rationality is of limited use when decisions through reasoning about future consequences are involved, which brings to surface the possible usefulness of epistemic rationality. Stanovich (2009) has argued that while individual and genetic objectives may intersect, they can also diverge. From an evolutionary viewpoint, epistemic rationality should be compliant to instrumental rationality and not constitute an end. Yet, epistemic rationality is fundamentally a notion connected distinctively to human mind (Evans, 2006).

3.5 Marxian economics

Although there is some room for behavioural considerations such as in the case of alienation (Catephores, 1990), classical political economy in the tradition of Marxian economics (and neo-Ricardian) economics do not attribute much importance on the psychological proclivities of economic agents, and their influence in decision-making. Nevertheless, decision-making is

governed by economic interests rooted in real conditions of modes of production and capital relations. An exception comes from sociological accounts of Marxian thought such as from the so-called critical or cultural political approach, where there is an emphasis on imageries and semiotics (Jessop, 2010). This analysis has not been linked yet to behavioural economics and economic psychology. The key objective of the semiotic political economy approach is to respond to criticisms of political economy, that the latter is insufficiently concerned with culture and semiotics (Jessop & Oosterlynck, 2008). This approach attempts to balance "soft cultural economics" about social and cultural life and "hard orthodox economics" with its focus on objective forces. As Jessop et. al. (2014) admit, orthodox Marxists sometimes forget the impact of contingent social practices in capital accumulation such as Gramsci's notion of cultural hegemony and its relevance for legitimizing the capitalist state against the sole applicability of economic determinism in theorizing.

3.6 Feminist economics

In feminist economics, there is extensive use of automatic forces such as emotions and intuition to explain behaviour. There is also evident use of reflective reasoning such as CFT in the analysis of female consumers' (see for example, Kemp, Bui and Grier, 2013) and workers' behaviour. Special forms of CFT such as prefactual thoughts are used for hedonic rationalizations, overcoming potential regret and cognitive deliberations. Prefactuals are deliberations through which individuals may evaluate the consequences of future alternatives and outcomes (Gleicher, 1995). Prefactuals arise before a decision is made when individuals contemplate imaginary alternatives to future events and their possible consequences. Often, they involve regret feelings as in the case when an individual thinks to herself, "If I buy those expensive shoes today and the utility bill comes earlier this month, will I regret it?" Prefactual thoughts may be heavily influenced by emotional responses to social influence from advertisements to social media comparisons. Besides counterfactual alternatives for regret, prefactual thoughts are used for decisions about the future to defend consumer behaviour. In this connection, there is consideration of possible rewards, which compensate for hard domestic work or going through a toxic business day at work.

4 Heterodox unity and a division of labor across different approaches

We argue, then, that the different heterodox approaches distinguished above (plus others we do not review) share a unity and also practice a division of labor regarding how different aspects of economic life can be understood in behavioral, and also counterfactual, terms. The latter aspect, CFT, is associated with the importance they all give to fundamental uncertainty, though the language of counterfactuality is usually not employed. What these heterodox approaches all reject in mainstream thinking is its Bayesianism and rational choice foundations. This then calls for alternative behavioral reasoning, which finds a systematic framework in the contemporary AS program, though here also most heterodox economists are more implicitly rather than explicitly attached to it.

Nonetheless, in any large research program there naturally exist different strategies and topics of investigation determined by how different research communities organize themselves around the thinking of different key proponents and the development of their ideas, and according to how different researchers prioritize different problems and aspects of economic

life. What our particular AS-CFT interpretation of heterodoxy does, then, is identify and emphasize a key principle operative throughout this program of investigation, namely, how more automatic and more reflective forms of behavioral adjustment interact, and uses this principle to distinguish three different kinds of heterodox approaches. Thus, at one end of a spectrum of strategies, there are approaches that place primary though not exclusive weight on automatic adjustment; then there are strategies that employ complex combinations of both forms of adjustment; then at the other end of the spectrum there are strategies that place primary though not exclusive weight on reflective adjustment.

Most familiar perhaps are heterodox approaches that tend to emphasize automatic forces in decision-making such as emotions and habits and place relatively little weight on reflective reasoning. Indeed, it is easy to associate reflective reasoning with mainstream rationality thinking – though, as we have argued, reflective behavioral reasoning is quite different – and indeed, rational choice is hardly reflective! This emphasis on automaticity, then, is most obvious in the case of evolutionary economics with its dependence on biology and its partial connection to advances in evolutionary psychology. Similarly, in old institutional economics there is much emphasis on a static conception of habits, although there are increasingly calls to incorporate heuristics and reflective reasoning for the purpose of adding fluidity in expectation-formation and as a way of explaining norm and rule following. There is a certainly an agreement, however, among many proponents of these schools that decision-making takes place at a largely non-reflective levels of thinking. Even among some Post-Keynesians, there is even an implicit use of the impact of psychological theory of attribution in the form of attributional inference.

Yet Post-Keynesians are generally more complicated. While the analysis of convention and average opinion is compatible with strong emphasis on automaticity, the whole program of combating underemployment equilibria with demand management works to adjust individuals' automatic behavioral response in such a way as to achieve economic and social goals in a more reflective, policy-driven way – a combination of both types of adjustment. Economic agents still are best described in AS terms, but enlightened demand management reframes the effects and consequences of their behavior, if not their motivations. This, then, is one strategy for combining the two types of response that gives CFT thinking an important role via economic policy. Another version of this strategy takes a step further and shows how economic agents themselves can combine both types of behavior.

Here counterfactual reasoning acquires a concrete role when emphasis is placed on how different groups of heterogeneous agents form their expectations and engage in different types of decision-making. Feminist economics, then, sees behavior as highly gendered, because women and men's (automatic) behavioral adjustment typically exhibits gendered heuristics. Yet when institutions and social relationships are organized more equitably, in part what this can involve is that people then respond to their circumstances in a less automatic and more reflective manner. Thus, this analysis moves from gendered automatic adjustment behavior to one, which gives additional weight to reflective reasoning as an effect of social change, where the weight the latter has depends on the extent to which women and men think, in CFT terms, about how they could alternatively interact with one another.

Along these lines, then, Marxian economics, with its class-based view of society, similarly distinguishes groups of heterogeneous agents who differ in their expectations and types of decision-making. Like feminists, Marxists believe people usually respond to their circumstances in a largely automatic manner. At the same time, the theory of working class consciousness assumes people have a capacity think about how the world could be were it not based on class, again a kind of CFT thinking, and this also creates a role for a more reflective reasoning that works against the prevalence of automatic response to a person's class position. Thus, Marxian economists also employ what we might term a mixed or hybrid view of behavioral adjustment.

Finally, consider a heterodox approach that while recognizing the role played by automatic adjustment in its behavioral analysis, nonetheless places greater weight on reflective adjustment. Austrian economics also emphasizes agent heterogeneity, though across individuals rather than across groups of people. For Hayek, then, individuals are different from one another because they occupy different locations in the economy. This means knowledge is highly decentralized, that economic agents always have local understanding of economic relationships specific to their own circumstances, and this makes aspect of their adjustment to those circumstances relatively automatic. Yet the Austrian approach places important weight on Knightian uncertainty, and ''Hayekian economic expectations" accord a special role to imagination and entrepreneurship, a more reflective sort of response to an individual's situation. In effect, automatic adjustment constitutes the backdrop against which more imaginative, reflective entrepreneurial adjustment occurs.

5 Concluding remarks

Overall, we believe that different heterodox approaches share behavioral reasoning combined with counterfactual thinking, and their differences can be subsumed under how they interpret the balance between automatic and reflective adjustment. Currently, there is a lack of an integrated platform that can carry heterodox approaches one step ahead and little evidence of convergence between approaches as being anywhere near achieved (Hodgson, 2019). Our argument, however, is that they possess an unappreciated unity and that the differences between them regarding automatic and reflective adjustment derive from their different subjects of investigation within that unity.

While the variable relevance of heterodox schools regarding the mix of automatic and reflective adjustment could unimpressively be hypothesized in the first instance, our analysis offers specific explanations of this relevance, uncovers a new territory for fruitful interaction, encourages the use of heuristics in terms of the AS-CFT connection, and paves the way to a shared ontology across heterodox approaches.

In closing, we hazard a speculation about how this shared platform might evolve in the future. The world today seems to becoming increasingly complex and fast-changing due to rapid development of technology and greater international interdependence. We suggest, then, that in an AS-CFT framework this calls for greater attention to reflective response on the grounds that economic agents' circumstances may become increasingly unfamiliar and less susceptible to automatic adjustment. Thus, in another reading of the orientation of most heterodox approaches today, there arguably appears to be greater emphasis on the creative and

conjectural aspect of expectations and types of decision making. For example, even Marxian economics may share this objective in its attempt to incorporate the rising importance of environmental concerns. Thus, the AS-CFT framework could potentially offer a platform for examining different forms of reflective reasoning, clarify deeper frictions arising from the rationality debate, motivate communication, interaction and expansion towards developing eclectic approaches, and generate new debates between heterodox approaches according to their respective investigations into the balance between automatic and reflective adjustment.

References

Aligica, P. D., & Evans, A. J. (2009). Thought experiments, counterfactuals and comparative analysis. The Review of Austrian Economics, 22(3), 225-239. Essays in contemporary austrian economics. Aldershot: Edward Elgar.

Altman, Morris, ed. (2017) Handbook of Behavioural Economics and Smart Decision-making: Rational Decision-making within the Bounds of Reason, Cheltenham: Edward Elgar Publishing.

Arena, R., & Larrouy, L. (2015). The Role of Psychology in Austrian Economics and Game Theory: Subjectivity and Coordination (No. 2015-15). Groupe de Recherche en Droit, Economie, Gestion (GREDEG CNRS), Université Côte d'Azur, France.

Baddeley, Michelle (2017) Behavioral Economics: A Very Short Introduction, Oxford: Oxford University Press.

Barkow, J. H., Cosmides, L., & Tooby, J. (Eds.). (1992). The adapted mind: Evolutionary psychology and the generation of culture. Oxford: Oxford University Press.

Bernheim, B. Douglas and Antonio Rangel (2007) "Toward Choice-Theoretic Foundations for Behavioral Welfare Economics," American Economic Review 97 (2): 464-470.

Bernheim, B. Douglas and Antonio Rangel (2008) Choice-Theoretic Foundations for Behavioral Welfare Economics," in A. Caplin and A. Schotter, eds., The Foundations of Positive and Normative Economics, Oxford: Oxford University Press.

Boettke, P. J., & Prychitko, D. L. (1994). The future of Austrian economics. The Market Process: Essays in Contemporary Austrian Economics. Boettke and Prychitko, eds. Brookfield, Vt.: Edward Elgar, 287-93.

Butos, W. N. (Ed.). (2010). The Social Science of Hayek's The Sensory Order. Emerald Group Publishing.

Butos, W. N. & R. Koppl (1993). Hayekian Expectations: Theory and Empirical Applications. Constitutional Political Economy. 4(3): 303–329.

Butos, W. N. & Koppl, R. (1997). The Varieties of Subjectivism: Keynes and Hayek on expectations. History of Political Economy. 29(2): 327–359.

Cosmides, L. (1989). The logic of social exchange: Has natural selection shaped how humans reason? Cognition, 31(3), 187–276.

Cosmides, L. & Tooby, J. (2000). Consider the source: The evolution of adaptations for decoupling and metarepresentation. In D.Sperber (Ed.), Metarepresentations (pp. 53-115). Oxford: Oxford University Press.

Davis, J. (2018) Extending Behavioral Economics' Methodological Critique of Rational Choice Theory to Include Counterfactual Reasoning, Journal of Behavioral Economics and Policy 2: 2.

Davis, J. and T. Koutsobinas (2021) Counterfactual Thinking and Attribute Substitution in Economic Behavior, Review of Behavioral Economics 8 (1): 1-23 (2021).

D'Amico, D. J., & P. J. Boettke (2010). Making Sense out of the Sensory Order. In Butos, W (ed.) The Social Science of Hayek's 'The Sensory Order'. Emerald Group Publishing Limited: 357-381.

DeMartino, G. F. (2020). The confounding problem of the counterfactual in economic explanation. Review of Social Economy, 1-11.

Catephores, G. (1990). Alienation. In Marxian Economics (pp. 45-49). Palgrave Macmillan, London.

Earl, P. E. (2013). Satisficing and Cognition: Complementarities between Simon and Hayek. In Hayek and Behavioural Economics. Springer: 278-300.

Earl, P. & B. Littleboy (2014). GLS Shackle. Springer.

Evans, J. S. B. (2006). Dual system theories of cognition: Some issues. In Proceedings of the Annual Meeting of the Cognitive Science Society (Vol. 28, No. 28).

Fodor, J. (2001). The mind doesn't work that way. Cambridge, Mass.: MIT Press

Gleicher FD, Boninger D, Strathman A, Armor D, Hetts J, Ahn M. 1995. With an eye toward the future: the impact of counterfactual thinking on affect, attitudes, and behavior. In Roese NJ, Olson JM (eds). What Might Have Been: The Social Psychology of Counterfactual Thinking. Erlbaum: Mahwah, NJ; 283–304.

Hertwig R, Herzog SM, Schooler LJ, Reimer T (2008) Fluency heuristic: a model of how the mind exploits a by-product of information retrieval. J Exp Psychol Learn 34:1191–1206

Hodgson, G. M. (1988). Economics and Institutions: A Manifesto for a Modern Institutional Economics. Cambridge and Philadelphia: Polity Press and University of Pennsylvania Press.

Hodgson, G. M. (1997). The Ubiquity of Habits and Rules, Cambridge Journal of Economics. 21(6): 663-684.

Hodgson, G. M. (1998). On the evolution of Thorstein Veblen's evolutionary economics. Cambridge journal of economics, 22(4), 415-431.

Hodgson, G. M. (2003). The Hidden Persuaders: Institutions and Individuals in Economic Theory, Cambridge Journal of Economics. 27(2): 159-175.

Hodgson, G.M. (2009), 'On the Problem of Formalism in Economics', in E. Fullbrook (ed.), Ontology and Economics: Tony Lawson and his Critics (New York: Routledge), pp. 175–88.

Hodgson, G. M. (2019). Is There a Future for Heterodox Economics? Institutions, Ideology and a Scientific Community. Edward Elgar Publishing.

Infante, Gerardo, Guilhem Lecouteux, and Robert Sugden (2015) Preference purification and the inner rational agent: a critique of the conventional wisdom of behavioural welfare economics, Journal of Economic Methodology 23 (1): 1-25.

Jensen, H. E. (1987). The theory of human nature. Journal of Economic Issues, 21(3), 1039-1073.

Jessop, B. (2010). Cultural political economy and critical policy studies. Critical policy studies, 3(3-4), 336-356.

Jessop, B., & Oosterlynck, S. (2008). Cultural political economy: On making the cultural turn without falling into soft economic sociology. Geoforum, 39(3), 1155-1169.

Jessop, B., Young, B., & Scherrer, C. (Eds.). (2014). Financial cultures and crisis dynamics. Routledge.

Kahneman, D. (2003). Maps of bounded rationality: Psychology for behavioral economics. The American Economic Review, 93(5), 1449-1475.

Kahneman, D. and A. Tversky (1982) The simulation heuristic, in D. Kahneman, P. Slovic, and A. Tversky, eds., Judgment Under Uncertainty: Heuristics and Biases, New York: Cambridge University Press: 201-208.

Kahneman, D., and C. A. Varey (1990) Propensities and counterfactuals: The loser that almost won, Journal of Personality and Social Psychology 59(6), 1101-1110.

Kemp, E., Bui, M. Y., & Grier, S. (2013). When food is more than nutrition: Understanding emotional eating and overconsumption. Journal of Consumer Behaviour, 12(3), 204-213.

Keynes, J. M., 1921. A treatise on probability, as reprinted in Collected writings of J. M. Keynes, Vol. VIII, by D. E. Moggridge (Ed.). London: Macmillan, 1973.

Keynes, J. M., 1930. A treatise on money, London, MacMillan. Reprinted in the collected writings of J. M. Keynes, vol. V and VI, by D. E. Moggridge (Ed.). London: Macmillan, 1973.

Keynes, J. M., 1936. The general theory of employment, interest and money, New York: Harcourt and brace and world. Reprinted in the collected writings of J. M. Keynes, Vol. VII.

Koppl, R., & Luther, W. J. (2012). Hayek, Keynes, and modern macroeconomics. The Review of Austrian Economics, 25(3), 223–241.

Koutsobinas, T. T. (2004). The formation of conventional expectations in Keynesian fundamental uncertainty. International Journal of Social Economics.

Koutsobinas, T. (2008). The Formation of Conventional Expectations under Strong Uncertainty: A Reply, International Journal of Social Economics. 35 (1): 125–132.

Koutsobinas, T. T. (2014). Keynes as the first behavioral economist: the case of the attribute-substitution heuristic. Journal of Post Keynesian Economics, 37(2), 337-355.

Koutsobinas, T. (2021). Attribute substitution, earlier-generation economic approaches and behavioural economics. Review of Social Economy, 1-30.

Langlois, R. N. (1986). Rationality, institutions, and explanation. Economics as a process: Essays in the new institutional economics, 225-255.

Lieberman, M. D., Gaunt, R., Gilbert, D. T. & Y. Trope (2002). Reflection and reflexion: A social cognitive neuroscience approach to attributional inference. In M. P. Zanna (Ed.), Advances in experimental social psychology (pp. 199–249). New York: Academic Press.

Morgan, J., & Olsen, W. (2011). Conceptual issues in institutional economics: clarifying the fluidity of rules. Journal of Institutional Economics, 7(3), 425.

Moss, L. S. (1997). Austrian economics and the abandonment of the classic thought experiment. In: Keizer, W., Tieben, B., & van Zijp, R. (Eds.), Austrian economics in debate. Routledge

Muramatsu, R., & Barbieri, F. (2017). Behavioral economics and austrian economics: Lessons for policy and the prospects of nudges. Journal of Behavioral Economics for Policy, 1(1), 73-78.

Norem, J.K., Chang, E.C., 2002. The positive psychology of negative thinking. Journal of Clinical Psychology 58 (9), 993–1002.

Rutherford M. (1988). Learning and Decision-Making in Economics and Psychology: A Methodological Perspective. In Earl P.E. (Ed.) Psychological Economics. Recent Economic Thought Series, vol 13. Springer, Dordrecht.

Schelling, Thomas C. (1969) Models of Segregation, American Economic Review, 59(2), pp. 488-93.

Shackle, G., 1967. The years of high theory. Cambridge: Cambridge University Press.

Shackle, G., 1972. Epistemics and economics. Cambridge: Cambridge University Press.

Shackle, G., 1979. Imagination and the nature of choice. Edinbrugh, U.K., Edinbrugh University Press.

Simon, H. (1980). Cognitive Science: The Newest Science of the Artificial, Cognitive Science. 4(1), 33-46.

Stanovich, K. E. (2009). Distinguishing the reflective, algorithmic, and autonomous minds: Is it time for a tri-process theory?

Stoelhorst, J. W. (2014). The future of evolutionary economics is in a vision from the past. Journal of Institutional Economics, 10(4), 665-682.

Sugden, Robert (2000) 'Credible Worlds: The Status of Theoretical Models in Economics', Journal of Economic Methodology, 7(1), March, pp. 1-31.

Tetlock, P. E., & Belkin, A. (1996). Counterfactual thought experiments in world politics logical, methodological, and psychological perspectives. Princeton, N.J: Princeton University.

Thompson, V. and Morsanyi, K. (2012) Analytic thinking: do you feel like it? Mind & Society, 11(1), 3-13.

Tooby, J. & Cosmides, L. (1992). The psychological foundations of culture. In J.H.Barkow, L. Cosmides, & J. Tooby (Eds.), The adapted mind: Evolutionary psychology and the generation of culture (pp. 19-136). New York: Oxford University Press.

Williams, C. W., P. R. Lees-Haley, & J. R. Price (1996). The role of counterfactual thinking and causal attribution in Accident-Related judgments. Journal of Applied Social Psychology, 26(23), 2100-2112.