RUNNING HEAD:

Enacting Chance and the Space of Possibilities

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Abstract

This special issue features authors invited to participate in a five-day workshop hosted by the Lorenz Center in Leiden, Netherlands. Enacting Chance, brought together scholars and artists interested in enaction and embodiment to present and discuss how chance played a role in their research, theory, and approach to their work. The productivity of intersections between disciplinary approaches were a particular focus. Thus, in this special issue we present perspectives from well-known enactivists, material engagement theorists, and philosophers of science: despite their different fields of specialization, their contributions to this issue highlight overlaps between approaches. Each provides a novel perspective on the impact that enactivist approaches to chance can have on current methods and frameworks for understanding cognition and creativity. This editorial presents key points from the articles in the issue and highlights common threads.

The phrase enacting chance denotes the generation of possibilities, that is, to make something possible. - Lambros Malafouris, this issue.

Possibilities studies is concerned with understanding what it means to have a sense of the multiple and open-ended nature of our presents, futures, and pasts (Glăveanu, 2023) – what Baumeister calls the matrix of maybes (Baumeister & Alquist, 2023). From the perspective of chance and serendipity scholars, this uncertainty comes from the dynamic interaction of people and things that arise naturally from living in a world in flux and reflect the dynamic nature of environmental change (Rietvald, 2022).

Indeed, one of the consequences of a world in flux is that chance arises all around us and is part of our everyday. Take a commute to work in a typical Western metropolis. Chance operates on a series of mundane levels from the socio-political scale of whether last-minute talks have been successful, and so the train driver's union has called off their industrial action, to whether you crossed paths with the chatty neighbour who would delay you. Despite best-laid plans, arrival times are not determined. Even on the micro-level, walking involves the negotiation of random variations in people flow around the walker and the pavement surface, so each placement of a foot requires the navigation of uncertainty. However, these forms of chance do not violate expectations – they are within an easily visualised space of possible occurrences and constitute predictable components of the matrix of possibilities.

However, when we write about enacting chance in relation to possibilities, we are interested in how people use chance events to expand the existing possibility space in unpredictable and unanticipated ways. We are not interested in expected chance variations but in the sort of chance-inspired change which elicits unexpected effects. The nature of these effects may be on a personal or historical level (cf Boden, 2004) and may have effects on

longer or shorter timescales (Ross, 2022). Still, they have in common that they open up the Possible in ways that cannot be currently envisaged (Hanchett Hanson, 2023). This is why the study of engagement with chance and the complex relationship between accidents and sagacity - or, more succinctly, serendipity - is so important to the emerging field of Possibility Studies.

This special issue features authors invited to participate in a five-day workshop hosted by the Lorenz Center in Leiden, Netherlands. Planned during a pandemic in August 2021, the workshop's theme, Enacting Chance, brought together scholars and artists interested in enaction and embodiment to present and discuss how chance played a role in their research, theory, and approach to their work. The productivity of intersections between disciplinary approaches were a particular focus in the context of the workshop. Thus, we here present perspectives from well-known enactivists, material engagement theorists, and philosophers of science: despite their different fields of specialization, their contributions to this issue highlight overlaps between approaches and a growing awareness of the impact enactivist approaches to chance can have on current methods and frameworks for understanding cognition and creativity.

While selecting only a few of the topics discussed in the workshop, this special issue represents key themes raised by the participants over that week. Foremost is the importance of taking plurality as the common ground since the volume focuses on the intersections between philosophical, psychological, and cognitive aspects of discovering, exploiting, and generating chance. It should also be noted that the exploration of chance itself opens new opportunities within disciplinary boundaries, something that becomes clear in each of the articles to follow, where the explanatory power of enactivism is assessed as a method to which we can compare predictive processing as a theory of cognition (Gallagher, 2023), with which we can evaluate the limits of data science (Martinez, 2023), and that is useful in

multiple ways for reframing our approaches to creative cognition (Malafouris, 2023; Feiten, Peck, Holland & Chemero, 2023). Layering the lenses of enactivism and chance offers, that is, multiple possibilities for a deeper understanding of how we engage uncertainty in the everyday, and how that engagement can, in turn, lead to the generation of new possibilities for enaction.

Shaun Gallagher: Surprise! Why enactivism and predictive processing are parting ways: The case of improvisation.

In this article, Gallagher uses the lens of chance to highlight a key difference between enactivism and predictive processing (henceforth PP) in their ability to explain cognition. PP, as a theory based on the idea that cognition is about reducing our surprise in response to our changing environment, puts chance and cognition at odds with each other. Improvisation, however, is a clear example of cognition that incorporates chance. In dealing with dynamic interplay and attending specifically to the possible and novel, improvisation suggests that anticipation, rather than prediction, is the key cognitive mode. What we anticipate is a possibility rather than a probability or a certainty, and possibilities are what we engage with through cognition in an uncertain world.

In contrast with predictive processing (PP), enactivism can accommodate improvisation by taking up a more embodied stance. Gallagher notes that even PP proponents allow a role for affect in our responses to the environment. Enactivism goes further in seeing agency as distributed throughout the body and within the 'coupling' that occurs as we interact with each other and the world.

Interestingly, while Gallagher addresses these two theories, PP and enactivism as competing, they are not historically so opposed. Indeed, both start from a rejection of representational and computational models of the mind that has grounded our understanding

of mind-body relations for a long time. Indeed, both theories have even productively engaged with surprise and surprising events, in contrast to more traditional treatments of them as merely problematic phenomena. PP theories, for instance, have explained the pleasurable experience of novelty and play as nonetheless informed by some form of sound expectations, even if these are only understandable when we consider them within "patterns of sub-cortical influence and complex training enivironments" (Clark, 2018, 532). Enactive theories have provided a more radical - as in disruptive of traditional views - approach. A similar radical rejection of classical dichotomies can be found in the other articles in this special issue, where hylomorphic models of creativity that take for granted that creativity entails a one-directional application of cognition to matter come under pressure in favour of models that embrace embodiment and the creation of meaning through interaction.

Maria Martinez-Ordaz: Scientific understanding through big data: From ignorance to insights to understanding

For a machine, learning is about identifying patterns, not about identifying value. That is, all possible connections are equally valuable for an AI; it is humans who determine which of them might provide value in terms of (effectively, ethically) guiding action in the world. Martinez-Ordaz points out in this article that when we lack the ability to explain why we rely on the outcome of a process, because we do not know how that process results in the outcomes we purport to trust, it is because we are left without the possibility of real understanding. As a result, in such cases we cannot really distinguish between chance outcomes and process-driven outcomes.

In this way, AI results are similar to the results of insight: at the moment of gaining insight, we do not understand how we attained that level of understanding. We consequently test our insights, trusting them only insofar as they may be possibly true. Opaque epistemic systems like machine learning systems that deal with big data in a way we cannot possibly, prospectively at least, understand, similarly produce both trustworthy outcomes that, yet, require further confirmation. Like with insight, we can trust that the outcomes of AI are possible without necessarily understanding the processes that produced them. Notably, however, even if we did know the algorithmic, technical process by which AI came about such possible knowledge, this would still not give us enough to understand it.

This insight into understanding is perhaps the most interesting implication of Martinez-Ordaz' investigation of this situation. That is, understanding the steps in the process by which machine learning arrives at its conclusions, even when those conclusions are theoretically significant, does not explain that theoretical significance. In order to understand when AI/ML outcomes are valuable, we need them to be intelligible, which is not the same as having perfect information about the algorithm's steps. Scientific knowledge, for instance, requires the negotiation of standards that traditionally have delineated our understanding of what certainty is or should be. This distinctly human combination of value and logic is something we might be able to assume grounds our moments of insight, but it is something we miss in our understanding of AI, and yet is essential for scientific understanding.

Further, science represents a higher standard that the outcomes of processes we can trust should meet. Increasing our understanding of the world through scientific investigation should also make us more certain about what we can legitimately describe, explain, or predict. Data(-driven) science has challenged this straightforward understanding of the scientific enterprise's means, standards, and objectives. Moreover, instead of being presented as two extremes of a spectrum, ignorance and insight are intertwined. Indeed, Martinez-

Ordaz puts some effort into describing the path to scientific understanding: it is not simply an accumulation of information or resources but a way to deal with opaque epistemic processes; uncertainty is not only the starting point or the result of evidence-based processes but an intrinsic and indefatigable feature of them.

Lambros Malafouris: Enactychism: Enacting chance in creative material engagement

In this article, Malafouris uses chance to illustrate how agency and materiality are intertwined: the interaction between them changes the meaning of each as well as chance. Chance, as seen through the lens of material engagement theory, becomes that which links mind and environment. It allows us to consider the use of what Malafouris calls the 'creative gesture'--the motion of physical interaction with material that expresses the taking up of chance in a translational move, converting it into creative action.

Thus, the idea of chance appears as an entirely positive concept in this article. First, we see that not all "accidents" are "chances": while accidents are always disruptive, only chances are meaningful. He thus employs a distinction also used by McBurney and Ohsaw (2003) in what they call the "chance discovery" literature. Through the form-making being done by potters in the examples Malafouris offers, creative gestures arise when makers encounter an unexpected feature or response to their form-making efforts in the clay or the kiln.

In this sense, this idea of chance makes it also clear how creativity cannot be considered an event or a sequence of events but as a non-linear process that, through the engagement of new chances, changes its temporality and relevance along with the situation.

Chance, Malafouris notes, has duration. It shapes the agency of both the material and the maker: agency can no longer be the distinguishing factor that belongs to the mind but not to matter, it rather emerges as a feature intrinsic to creative actions. Finally, materiality is both what makes the emergence of chances possible and what can direct (i.e. have agency with respect to) the creative process.

These new meanings of chance, agency, and materiality also help reframe some long-standing questions regarding how we can understand creativity in practice. For example, creative gestures offer a way to understand the nature of artistic originality and the question of whether artists need to challenge and break creative habits (in terms of gestures and actions) to bring forward a creative product. Skill, in Malafouris' account, develops through engagement with chance and can be explained as an increasing ability to translate the unexpected into creative gestures.

Tim Elmo Feiten, Peck, Holland & Chemero: Between Chance and Complexity: on the Art and Science of Creative Constraints

Both Malafouris and Feiten, Peck, Holland & Chemero suggest approaches that dissolve the dichotomy between cognition and creative action, using chance as a bridging factor to show how they are intertwined. This has the further implication that chance (as an accident for Malafouris, as a constraint for Feiten, Peck, Holland & Chemero) is internal to the creative process rather than acting as an external disruption. Feiten, Peck, Holland & Chemero's paper offers a theoretical rejection of the hylomorphic model of creativity, wherein the mind directs creative action, by proposing a view of constraints as tools that shape the creative process. The article consists of several case studies in which this

internalization of chance as constraints offers a better explanation than the hylomorphic theory of how creativity emerges in artists' works.

Drawing from physics and the phenomenon of synergy, Feiten, Peck, Holland & Chemero make the point that patterns at one scale constrain the actions of those at a smaller scale, who are swept up by the actions of the greater system of which they are a part. In his examples, interpersonal synergies give rise to jazz music and improvised choreography; art pieces such as Duchamp's Fountain and Three Standard Stoppages and Braxton's suggestive compositions only exist as art against the constraints they resist. Constraints provide the context for shaping improvisations and artistic expressions of creativity, interacting with creativity and framing it rather than interfering with or preventing it.

Importantly, chance in this account is interactive and interpersonal and provides productive constraints by shaping potential responses and creating new possibilities within shared space. The synergy between people or in society, rather than directing all motion, creates a flow in an unplanned direction and thus makes new connections and responses possible.

Final Reflections on this Enacting Chance special issue

Notably, each of the articles in this special issue on Enacting Chance discusses the role of chance in context, though these are as diverse as jazz music improvisation and the algorithmic output of machine learning. In each case, these examples show how chance functions to link the cognitive and the material. Gallagher appeals to improvisation, the skillful incorporation of chance into our cognition, to argue that anticipation – expecting that

new possibilities will arise without knowing what they will be – rather than prediction, better describes how we cognize in an uncertain world. Martinez-Ordaz recognizes that knowing what lies behind an outcome must fit into our science practices, and so be intelligible – something transparency and technical explainability cannot always achieve. Using insight as her model, this discussion calls us to address new uses of AI within their context of use through understanding the context of practice and the embodied life of the user, whose understanding depends on more than identifying causal relationships. Malafouris and Feiten, Peck, Holland & Chemero take up creative cognition, using chance to illustrate the intimate relationship between mind and material. These approaches are not surprising from a group tasked with linking enaction and chance, but they do also raise some interesting questions that we can take forward.

We can, for instance, consider the concept of understanding put forth by Martinez-Ordaz, in light of the other contributions. Recall that if we do not understand–that is, find intelligible, in very human terms–how a process comes to a result, then we cannot distinguish between chance results and the results of a logical process. Our understanding, that is, is derived from our ability to pick out chance events. This comes to bear in an implication raised by the other three articles, as they hone in on the overlaps between creativity and interaction–do they neglect the differences, perhaps too much? That is, if agency is no longer a distinct feature of a mind that works upon a material, even in a responsive manner, then how can we distinguish inventions from discoveries? Further, if we take the value of constraints a bit further than Feiten, Peck, Holland & Chemero do in their article, do we blur the lines too much between composition and improvisation? These are not new problems for enactivist approaches. However, attending closely to chance's role in these processes highlights our tacit but consistent reliance upon other dichotomies to differentiate between luck and skill - a dichotomy that, for example, still helps us to distribute epistemic load and

credit, to recognize authorship and craftmanship, to pay attention to individual contributions within communal contexts.

As Malafouris comments, enacting chance just is the generation of possibilities, and as we see in all four articles, how we enact chance is intertwined with how we respond to each other and to our world. However, if skill is related to how we engage chance, and we learn from our failures and successes in our responses to chance events and otherwise intrusions, then our understanding of what chance is becomes very interesting and important. Further, if our responses to chance–and hence, this set of relevant and creative skills–are embodied, do they remain entirely personal or can they be taught? For instance, we commonly think of anxiety and panic as responses to uncertainty and unpleasant surprise, so can skills in coping with chance in the arts offer interventions for those who feel unprepared in the face of uncertainty? This special issue, then, offers but a tip of an iceberg that is the investigation of chance, its interpretation and its influence in the realms of cognition and creativity.

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