

Revisiting Evaluation as a Science

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Background: The evaluation field needs profound changes to address the accelerating systemic imbalances and to fulfill its role responding to the transformational imperative.

Purpose: In this article, we argue that the transformational imperative depends on a deep epistemological review of evaluation's core pillars. We discuss some of science's basic tenets and propose Theory U (Scharmer, 2016, 2018) as a tool for transformative thinking.

Setting: Drawing on the social-ecological systems standpoint and Maturana's perspective (Parsons et al., in press), we advocate for principles aligned with the emergent systems science: the interdependence of subject and object; the focus on cascading interactions with reciprocal affection across domains; recursiveness and the emergence of complexity from interacting dynamic phenomena.

Keywords: *transformational imperative; Three Horizons initiative; systems sciences; social-ecological systems; biology of cognition; epistemology.*

Intervention: This is a conceptual synthesis position paper. The literature selection is guided by our expertise and experience in evaluation, neuroscientific studies of cognition, language, and culture; scientific and philosophical works on science and epistemology; systems thinking; and cross-cultural evaluation.

Data Collection and Analysis: Not applicable.

Findings: Evaluators must integrate the insights proposed and align methodologies with a systems perspective to tackle the polycrisis systemically and transform the field sustainably.

Impressive challenges have shaken evaluators' world, demanding a thoughtful resignification of the field and its practitioners—that is, a remaking of evaluation's significance (including founding principles, theories, approaches, procedures, roles, and consequences) and practitioners' capacities in addressing today's challenges. How can evaluators be active agents in responding to systemic derangements in domains such as environmental health, social justice, equity, and financial distribution and allocation, in ways that benefit living and nonliving beings and inspire a sense of responsibility and purpose? How can evaluators help restore balance in nature? How can they contribute to regenerating the planetary systemic dynamic equilibrium in various spheres, including restoring biodiversity and climate periodicity? How can evaluators act in a world that experiences massive population displacements driven by extreme social inequality, conflict, violence, persecution, disasters, and the lack of safe living conditions? How can evaluators deal with a world that has lost its stability and its claim to predictability and that emerges as multiple and diverse across many dimensions? What intellectual tools must be mastered to adjust evaluation practice to the complexity, diversity, emergent phenomena, and ongoing changes that are faster and more evident than ever? These concerns prompt our reflection on science as widely practiced and articulated in evaluation documents, to support the consequential and meaningful evaluator's proficiency within the transformational imperative.

The editors of this *JMDE* issue challenged the authors with the operational definition of “the transformational imperative” as

The urgent necessity to pursue profound, systemic change in response to the complex and interconnected global challenges—social, ecological, political, and economic—accelerating and converging in the current polycrisis. It is a moral and practical call to confront structural injustices and planetary degradation by reimagining and transforming systems toward more just, regenerative, and resilient futures.

We claim that without transforming the epistemological foundations of science, transformational efforts will remain void. In other words, the worldview transformation required of

evaluators, evaluation managers, commissioners, and stakeholders to stop doing business as usual and to effectively promote the demanded needs requires an epistemological transformation of the field. In this paper, we propose a direction grounded in scientific and philosophical inquiries.

This is not an empirical study. Rather, it is a conceptual synthesis position paper that draws on authoritative sources to address the transformational imperative. The literature selection supporting this paper is guided by the two authors' expertise and experience in evaluation; neuroscientific studies of cognition, language, and culture; scientific and philosophical works on science and epistemology; systems thinking; and cross-cultural evaluation.¹ The fortunate conjunction of our gazes enables us to navigate the proposed considerations transdisciplinarily and cope with Scriven's (1993) aspirational transdisciplinary model for the rise of the evaluation field.

Scriven (1993, pp. 8–10) argues that the understanding of how and why evaluation developed from a practice to a highly skilled, professional practice to a field-specific discipline, and finally to an autonomous discipline and transdiscipline, becomes known from the evaluation transdisciplinary model's three distinguishing characteristics: epistemological, political, and disciplinary. Here, we explore the epistemological pillar and propose substantial changes. The political and disciplinary characteristics or consequences of the recommended shift can be inferred by practitioners and researchers of the field. We invite evaluators to take a clear, conscious stance regarding the scientific assumptions of evaluation from an epistemological standpoint; that is, to inquire into *how we know what we know* and *how we do what we do in the process of doing*. Ultimately, *how we make sense of the world*.

At the outset of the evaluation field, Scriven (1993) articulates the relationship between evaluation and science, and the usefulness of adopting a scientific evaluation perspective. He formulates evaluation as

... all that distinguishes astronomy from astrology, good explanations from bad ones, good experimental designs—or bridge designs—from inferior ones, good scientists and engineers and technologists from run-of-the-mill ones. It is a discipline that is part of

¹ Our approach can be further appreciated in Magro and Van den Berg (2021); Magro et al. (2021); Parsons et al. (in press); and Parsons and Winters (2023).

every discipline because it distinguishes the discipline from pretentious jargon, just as one distinguishes good food from garbage. (Scriven, 1993, pp. 47–48)

Patton (2023) notes that Scriven's perspective is steeped in Western philosophy, as evidenced by his language, ideas, metaphors, and examples. Patton (2023) says that "he did not limit scientific evaluation to universities and academic work but rather saw systematic inquiry as a way of making sense of the world and differentiating what worked from what didn't in any context." (para. 3)

Scriven also positioned evaluation as scientifically legitimate by arguing that objectivity is achievable (Patton, 2023; Scriven, 1993). Concurring with evaluators worldwide, Patton argues that evaluation as a science enhances credibility and brings evaluators together with scientists to defend science.

These references suggest the usefulness of a scholarly study exploring how the idea of evaluation as science was introduced and disseminated in the field, evidencing the established Western science epistemological presuppositions consciously or unconsciously adopted, and exploring how science has acquired the enormous prestige it has and its consequences (Latour, 1988; Latour & Woolgar, 1979). Such a literature review can contribute beyond practical guides (such as Podems, 2018). It can offer a clear epistemological background for evaluative thinking and raise practitioners' awareness and self-consciousness, evidencing a systemic dynamic throughout history that involves elements not restricted to a single discipline. Nevertheless, the proposed investigation is beyond the scope of the current paper, which fully acknowledges the wealth of literature on evaluation as a scientific enterprise.

The fundamental tenets of science dramatically shape the evaluator's work, guiding evaluative rationales and fieldwork; the preparation of reports and presentations; and the assessment of the quality of evaluative work by commissioners, managers, and leaders. However, dominant scientific tenets related to objectivity, causality, predictability, and reductionism are insufficient to address the current unbalanced dynamic of the contemporary world, often referred to as VUCA—volatile, uncertain, complex, and ambiguous. The future designer specialist with a focus on sustainable transformation Stephan Grabmeier (2020) argues that the planetary situation has

changed dramatically since the term VUCA was coined in the 1980s. The term has lost its meaning and ability to guide us in dealing with current circumstances, and it fails to offer insights into potential future scenarios. Grabmeier (2020) proposes the term BANI—brittle, anxious, nonlinear, and incomprehensible—for a clearer and more tangible picture of our current experience: What once we saw as volatile ceased *to be reliable*; uncertainty has been replaced by *anxiety*; *nonlinear logic systems* seem to better treat the course of dynamic phenomena than complexity; ambiguity appears now *incomprehensible*.

The power of the changes we are experiencing requires close attention to our assumptions across all sectors of our lives. Within an evaluator's theory and practice, epistemological and scientific assumptions are often not apparent, as they are the very material that weaves the community's professional, intellectual, and cultural fabric. As humans, we are often unaware of what we think, how we think, and why and how we do what we do in our daily and professional lives (Magro & van den Berg, 2021; Maturana, 1990; Maturana & Varela, 1992). Although alternative scientific propositions have been discussed in evaluation by, for example, Chilisa (2013), Chilisa and Bowman (2023), Gates (2017), and Hummelbrunner (2011), the transformational imperative warrants further review.

This article aims to strengthen transformational thinking and action by evaluators, individually and collectively. It proposes a direction for pursuing the envisaged epistemological transformation and describes one strategy for mindset shift: Theory U (Scharmer, 2016, 2018). It concludes by summarizing its itinerary and inviting further conversations.

Transformation of Evaluation's Underlying Scientific Tenets

In advocating for a rethinking of the dominant scientific basis of evaluation, we are engaged in an effort coordinated by the International Evaluation Academy (IEAc), a global movement of volunteers committed to influencing evaluation policy, professionalism, and transformative impact. IEAc set up the Three Horizons (3H) initiative as a beacon for its collective work to respond to the needed transformation. The initiative uses the 3H methodology,² building on a survey of evaluators to

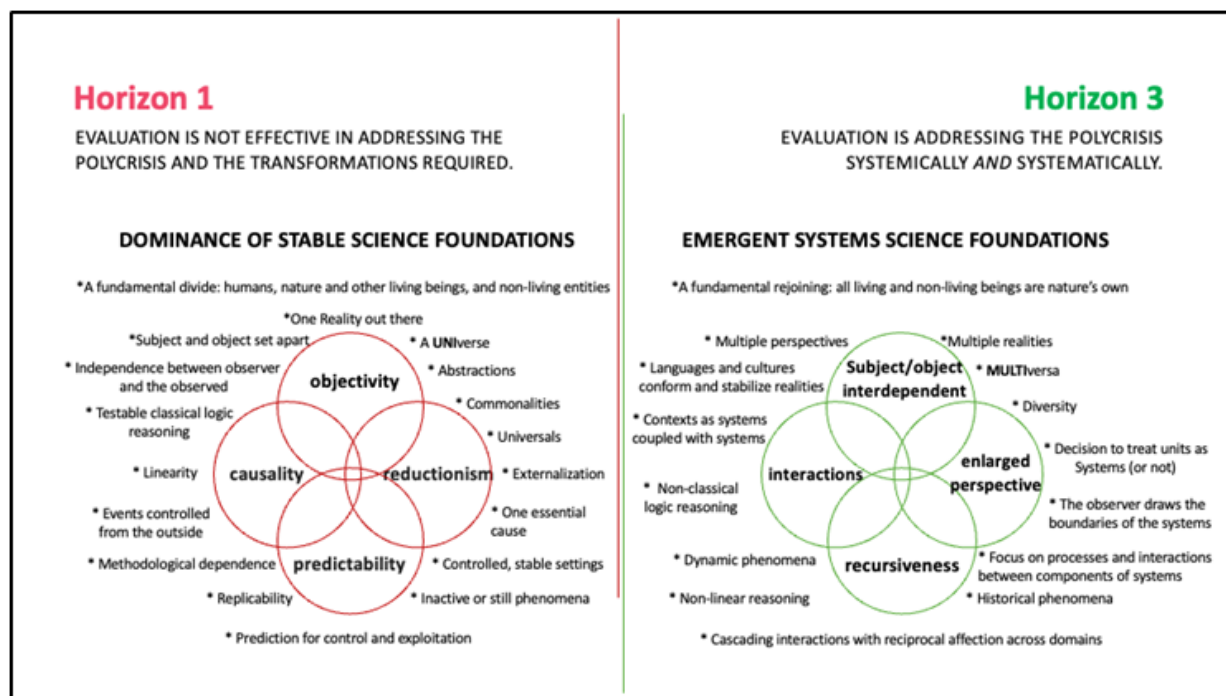
² For a detailed view of the 3H methodology and IEAc's initiative, see Ofir et al.'s paper in this *JMDE* issue.

assess *current aspects* of the evaluation field (the current situation, Horizon 1, H1) and to address global challenges toward a *desirable future* (the aspirational future, Horizon 3, H3). The aspirational future envisions evaluation contributing to the transformation of social-ecological systems for a just and regenerative planet, supporting the rights and epistemologies of diverse social-cultural groups and local communities, and promoting the well-being of natural systems. Furthermore, H3 is conceptually, technically, politically, and strategically proficient for a time of transformation. It inspires evaluators and repositions evaluation by thoughtfully and

intentionally considering *interventions in the space between H1 and H3* (Horizon 2, H2). When working in the H2 space, evaluators are called on to distinguish actions that could pull the situation backward to H1 (H2- interventions) from actions that draw the situation toward H3 (H2+ interventions).

We claim that the commonly used set of scientific tenets underpinning H1 does not serve as the foundation for H3. Figure 1 summarizes the discussion that follows, illustrating a cluster of H1 scientific canons, in contrast to those here posited for H3.

Figure 1. H1 and H3 Epistemological Foundations



In this short article, we do not present a comprehensive review of the foundational scientific canons for either H1 or H3 but rather address those that our research and experience suggest are especially important for evaluators and evaluation users to distinguish and understand.

Contrasting H1 and H3 Fundamental Tenets

The H1 cluster has key elements present in conventional Western science, structured as a systematic exercise that builds and organizes knowledge through testable explanations and predictions. It entails the systematic application of

procedures and concepts, grounded in agreements among its practitioners regarding methods, concepts, and what counts as data (see, e.g., Latour, 1988; Latour & Woolgar, 1979; Maturana, 1988a, 1990; Rorty, 1990). It involves observing, experimenting, organizing, analyzing, and displaying data, seeking to uncover the underlying principles of the universe and the physical and natural phenomena around us. The social sciences adapt methods and concepts from the formal and natural sciences to the study of social phenomena. These are usually treated as separate from nature, including living beings and nonliving entities, and from the medium in which they exist (see, e.g., Berger & Luckmann, 1966).

Conventional Western science is mostly guided by objectivity, causality, predictability, and reductionism, which are taught as early as middle school (see, e.g., Baby Professor, 2024). Its claims include:

1. Reliance on empirical evidence gathered through systematic observation, experimentation, or measurement, typically under highly controlled and stable conditions. No focus on dynamics is at stake.
2. Claims can be proven wrong through observation or experimentation; they must be replicable, testable, and falsifiable, allowing peers to review and validate the scientific work using the same methods and stable observational conditions.
3. Trust in objective data and analysis, free from the interference of the scientist/researcher, from any bias or opinion.
4. Reasoning is ruled by classical logic, which shapes the whole research process. Conclusions must follow logically from the evidence presented.

Evaluators recognize these guidelines in evaluation capacity development programs or in certain definitions of evaluation. In contrast, we posit in this article that the foundations of H3 should be derived from the emergent systems sciences. They include:

1. Rejoining living and nonliving beings, including humans, in a social-ecological system paradigm.
2. Recognizing the impossibility of making reference to an external world, independent of the observer, rather than assuming objectivity.
3. Acknowledging that a diversity of realities emerges from the two foundations above, so that instead of a *universe* we have *multiversa*. That is to say that multiple social-ecological systems emerge from different languages, cultures, and ecologies, and the idea of a single, overarching *universe* posited by dominant Western culture and science does not align with experience.
4. Emphasizing recursiveness and seemingly disruptive dynamics as fundamental historical dynamics of systems.
5. Engaging in nonclassical logic models,³ nonlinear reasoning, and the observation of cascading interactions with reciprocal affection

across domains that go beyond simple cause-and-effect models.

Evaluators have witnessed continuous and profound changes in the overall context in which they operate. They have exhibited flexibility and adaptability by developing new approaches to address changes. Examples of proposed approaches adapted to contemporary challenges include feminist evaluation, culturally responsive evaluation, Indigenous evaluation, multivocal evaluation, climate change evaluation, and benefit-cost evaluation, as listed by Patton (2022) in his panorama of evaluation approaches. We fully support these efforts, but they are undermined by the persistence of the conventional scientific mindset, an enduring framing that intrudes on evaluators' inner compass, values, and intentions. We end up with conflicts at our core.

The difference in the use of the H1 and H3 science canons identified above can be illustrated by the pivotal concept of polycrisis (e.g., Patton, 2019; Stufflebeam, 2018). The term "polycrisis" is used, in evaluation and related fields, to refer to the convergence of unprecedented planetary systemic disruptions that accelerate and cluster in a complex, interconnected, and mutually reinforcing manner. It specifies a systemic imbalance in multiple domains, including climate change, biodiversity loss, environmental degradation, and social injustice and inequality, all interconnected in a web of mutually recursive and reinforcing interrelations with harmful consequences. Numerous publications in evaluation use this term to address the current planetary scenario (e.g., Magro & van den Berg, 2021; Magro et al., 2021; Parsons et al., in press).

The phenomenon referred to as polycrisis cannot be detached from its historical emergence and the Anthropocene. It cannot be treated in the abstract, stripped of our historical experience and the contexts that made it possible. Our experience with the polycrisis is not one of linear consequences from a unique causal sequence of events, as a deeply rooted pillar of the epistemological foundations of Western civilizations would suggest (Rorty, 1981; Maturana, 1988b). It is not even an all-of-a-sudden event, as the Merriam-Webster dictionary (n.d.) definition of "crisis" could lead us to imagine: "an unstable or crucial time or state of affairs in which a decisive change is impending, especially one with the distinct possibility of a highly undesirable outcome." This definition calls attention to "a

³ A wealth of literature presents alternative types of logic. As a matter of introduction see, for example, Beall and Restall (2006) and Priest (2008).

situation that has reached a critical phase,” a brief snapshot of a historically produced event. This limited view risks reinforcing superficial notions about imbalanced situations, whereas a systemic perspective reveals ongoing recursive patterns that produce these critical events, underscoring the importance of understanding underlying systemic interactions and overall dynamics. The mind-shift required by the systemic perception advocated here demands conscious effort and purposeful agency.

In what follows, we reflect on the current situation as defined by the transformational imperative, confronting the reductionist, objectivistic, linear, and compartmentalized way of reasoning typical of H1. We posit foundational tenets of science derived from emergent systems science as the basis for the H3 transformative imperative for evaluative practices in today’s world.

Evaluands as Historical Systemic Phenomena

Systems thinking perspectives, such as the one we advocate for H3 (Parsons et al., in press),

emphasize the historical and recursive dynamics of systemic phenomena, focusing on the interactions among components of selected systems, whether within or outside an established system’s border. In the 1940s, systems thinking was introduced to address dynamic, historical, and complex phenomena, inaugurating a form of reasoning not contemplated by the dominant scientific approaches at the time (Ramage & Shipp, 2009). Systems thinking brings the idea of systemic scientific reasoning into the scientific arena, as a video rather than a photograph or a series of pictures, to grasp the recursiveness of historical dynamic phenomena, as witnessed in the so-called polycrisis.

What does “recursiveness” mean, and why is it important in evaluation as a foundational science principle? Any intervention or interaction with any system results in a differential situation, which can be more or less clear to the observer of the interacting systems (Maturana & Varela, 1972). A recursive sequence can be represented as in Figure 2:

Figure 2. A Mathematical Representation of Recursiveness

$$\sqrt{2} = 2'; \sqrt{2'} = 2''; \sqrt{2''} = 2'''$$

An ordinary example from the evaluators’ practice is valuable. Evaluators often assess projects, programs, or policies in a community more than once. When the community first receives an evaluator, its members have no experience with the evaluation process. By the second visit, though, the evaluators work in a historically and differentially constituted context. A recursive movement marks the overall experience on this second visit; that is, the state experienced on the first evaluation no longer holds. The third time the community receives an evaluator, the context/situation will also differ from the second time (and from the first). On the second and third occasions, all stakeholders and evaluators can establish relationships that build on previous experiences. This history of interactions exemplifies how recursiveness operates in evaluation, influencing the overall evaluation process and outcomes over time. Evaluators who want successful engagement cannot ignore the recursive nature of historical processes. It applies not only to interactions with any community but also to all components of intervention processes and to all dynamics of the systems under observation. Recursiveness is the

dynamic of historical processes and is a key to understanding systemic phenomena. It can be observed in any domain at any time.

The current planetary situation underscores the urgency of an enlarged, dynamic, and historical way of thinking, and of developing scientific work with a systems perspective that can appropriately address the challenges of our times (Burgelman & Linke, 2025). Recognizing recursiveness in systemic processes helps us understand how interconnected global challenges—social, ecological, political, and economic—are accelerating and converging into an unprecedented systemic imbalance, driven by historical exploitative ways of living and interacting.

We posit that H1 science canons, which capture snapshots of historically produced events, draw attention to a situation’s potential *outcomes* without emphasizing the fundamental recursive and historical patterns of structural change that produce them. In the systemic perspective we promote for the H3 transformative imperative, we understand that the phenomena we experience result from an interconnected, dynamic, historical, recursive, and prolonged history of disruptive

interactions we, humans, have established among ourselves and with our medium (or context or environment), including other living beings (Parsons et al., in press). Recognizing these recursive patterns is essential for evaluators and scholars seeking to understand how the Anthropocene emerged and to foster transformative change, as “superficial and unexpected crisis” narratives obscure the systemic processes at play.

Multiversa: Making Science in a Pluralistic World

While pointing out what “polycrisis” may ordinarily mean if the concept receives only a dictionary interpretation, we find ourselves dealing with an *external* account of the daring situation we live in, so that evaluators, commissioners, managers of evaluations, and civil society are led not to feel close to, attached to, or responsible for it. This is a standpoint in Western culture, grounded in one of its most fundamental assumptions: the existence of an objective external reality—the *universe*—that everyone experiences.

We challenge this stance and expect many of our readers to do so as well. What we emphasize here is that the polycrisis is *not* a set of “external” issues with which we have no responsibility or attachment. On the contrary, they are deeply rooted in historically established ways of living, acting, and thinking that shape dominant global perspectives, thereby contributing to ecological disruption and social distress.

Historically silenced social and cultural groups have developed epistemologies and ways of living and doing that differ from the dominant Western perspective and emphasize the value of varied perspectives. The diversity of ways of living, doing, and thinking brings about worlds that differ from, and should be equally valued with, those that conventional science claims to have privileged access to. We refer to this as acknowledging the experience of multiversa rather than a universe.

In the field of evaluation, a wealth of work has been published presenting alternative epistemologies to conventional Western science. Two characteristics interest us here: First, these epistemologies often mirror ways of being in the world that live in harmony with the environment and do not feel or behave as if detached from it. In other words, the fundamental divide of conventional science, which splits humans on one side from nature, all other living beings, and nonliving entities on the other, does not hold. It is the case extensively presented by

Lunaape/Mohican Nicky Bowman (2014, 2018, 2025). She emphasizes the indelible relationship among living beings (including humans), nature, and nonliving entities, and indicates the potential for a change in understanding that humans are nature’s own. “We are individuals in a collective, indelibly tied to nature. This claim states a meaningful sense of ecology and claims to consider all phenomena related to our existence to occur in social-ecological systems” (Parsons et al., in press). The human-nature divide is one of the inaugural movements of Western science that we need to overcome.

Indigenous populations, various countries, and social groups have not universally adopted a Western perspective on science, nor have they followed its dominant features. Unique cultural and historical factors influence the approach to science, including the selection of scientific inquiries, how they are developed, individually or collaboratively, the dissemination of results, and the direction and impact of scientific work on local needs and concerns.

The professional field of evaluation was conceived as a multidisciplinary enterprise from its inception, with the convergence of many traditions emerging from different scientific disciplines. This convergence aligns with the selection of many concepts, methods, tools, perspectives, and interests for any specific evaluation process. Evaluators must actively acknowledge and incorporate diverse epistemologies and knowledge systems, ensuring that evaluation processes are relevant to the communities involved. The fact that local knowledge has been silenced and diminished in the past places additional pressure on evaluation professionals to intentionally bring it forth in ways that highlight its scientific contribution. Usually educated according to Western standards, evaluators may not recognize the fundamental importance of their philosophies and epistemologies of origin that must be considered during the evaluation process. This needs to change.

A second characteristic that differentiates non-Western approaches, in strictly epistemological terms, is the emphasis on *interconnectedness* rather than analysis (which focuses on parts and elements). The emphasis on interconnectedness offers the option of amplified or enlarged approaches rather than specialized ones and identifies the blind spots of the conventional Western approach.

A well-known example among evaluators is the South African philosophy Ubuntu, which prioritizes interconnectedness, compassion, and community, and promotes collaboration, inclusivity, and a sense

of shared responsibility. This deep trait of South African culture is evident across various aspects of the country's scientific inquiry. Ghanaian epistemologies and frameworks, such as the Nnobo system of communal collaboration in farming and industry, as well as the notion of Sankofa, a traditional concept that interrupts and challenges hegemonic notions of the linearity of time, have been proposed as epistemological guideposts for African evaluation and decolonial evaluation approaches more broadly (Asante & Archibald, 2023). In India, ancient wisdom cannot be devalued or taken as second-rate or unestablished knowledge. However, its principles and reasoning may not align with the tenets of the dominant Western scientific paradigm. In Greece and the region, the influence of ancient thinkers such as Aristotle and Plato is evident in the approach to science, particularly in the strong emphasis on classical logic, reason, and systematic inquiry. An earlier issue of *JMDE* (2023), in partnership with the IEAc, features meaningful pieces that illustrate our claims.

The above is just a small set of examples to support our statement that history, culture, and ways of living and thinking give rise to a variety of worlds and, accordingly, diverse bodies of scientific knowledge that must be recognized as equally legitimate and reputable in evaluative thinking and practice. The multifaceted world—or multiversa—needs to inspire perspectives conducive to transformative action in evaluation and beyond, toward the restoration of democratic, resilient, and sustainable lives.

Objectivity and Cognition

Since the early 1900s, the many changes in scientific areas like physics and the neurosciences, amplified by this century's amazing development of artificial intelligence, have promoted a revolutionary understanding of cognition, the relation between our way of thinking and doing, and the world we experience and can bring about in scientific inquiries. For example, the physicist Einstein suggested in his book *Relativity: The Special and General Theory* (1916) that the observer plays a crucial role in determining the outcome of an experiment. Later, Werner Heisenberg (1927) formulated a cornerstone of quantum mechanics. He proposed the uncertainty principle, which states that the more precisely one knows a particle's position, the less precisely one can know its momentum, and vice versa. Both Einstein and Heisenberg emphasize that

measurement (observation) influences the system under consideration.

This idea has thus been around for a long time. However, its importance has been downplayed because of the emphasis on objectivity in conventional science. Einstein's and Heisenberg's claims are often treated as loosely accepting a contingent bias in scientific work. However, in the evaluation context, these principles could be paraphrased as follows: Evaluators (as human beings in their roles as observers) influence the entire evaluation process (including project preparation, data gathering, organizing, analyzing, and reporting) and thus shape its outcomes. This realization is paramount, and evaluators cannot act as if these assumptions do not matter much.

From the 1960s onward, the Chilean neurobiologist Humberto Maturana conducted experimental work in the neurophysiology of vision, which led him to postulate that, as living beings, we cannot refer to an external and independent reality due to our biological constitution. This claim is not a prerogative of humans but applies to all living beings. Maturana argues for the inseparability of subject and object, of the observer and the observed, thereby denying one of the fundamental assumptions of Western civilization and science: the existence of an independent, external reality equal to us all. At the same time, he offers an unexpected foundation for Einstein's and Heisenberg's claims, transforming their understanding and amplifying their consequences. Maturana's work changed the course of neurophysiology and affected basic tenets in neuroscience. Humberto Maturana's famous quote (1978; 1988b; Maturana & Varela, 1992) "Everything is said by an observer to another observer that may be him or herself" states that one's observations, experiences, and statements are subject-dependent, thus uniting the observer and her/his observations, whether through linguistic or mathematical resources. We are all immersed in history, culture, and structural changes that are proper to living, including emotions, and are shaped by linguistic interactions with others in a cultural web of conversations. An appropriate account of living in language as a community makes clear that we create everyday worlds by naming objects, events, and situations, and by coordinating actions with others. These worlds are not independent, even though we too often treat them as such. (Magro, 1999; in press).

Maturana notes that a significant part of scientific work consists of specifying the operations required to make specific observations and experiences. We set up situations to experience what we want and to demonstrate to our peers, with

the precise specification of our inquiry's objectives and the expected experiences as results. This has nothing to do with preparing the means to reach an independent, external reality, or to uncover the truth (Maturana 1978, 1988a, 1988b, 1990). This means that scientific prediction is about what we shall experience if such-and-such a situation occurs. It is about experience, not about a world out there.

Although overly acclaimed and despite the tremendous progress made in the field, recent developments in artificial intelligence continue to reveal some of the ineradicable characteristics of human cognition that interest us when discussing objectivity in scientific work, evaluation, and other areas. Human cognition and intelligence depend on empathy, emotions, solidarity, intuition, values, ethics, and morals. Meaningful examples are described in Antonio Damasio's *Descartes' Error* (2005). He presents the famous case of Phineas Gage, who suffered severe frontal lobe damage from an iron rod accident in 1848. The accident led Gage to extensive "personality" changes while retaining "cognitive abilities." What struck scientists following the case is that although Phineas Gage could perform complex mathematical operations, for example, and remember considerable amounts of data (two common examples of cognitive abilities), he became incapable of making sound decisions, even simple ones, and making choices favorable to his own life. Damasio (2005) argues that emotions are not detrimental to rationality nor something independent of it. On the contrary, they are essential for effective decision-making and adaptive social behavior. The observation of brain damage unveils phenomena we are not daily aware of (see also Magro, 1999).

These references are examples from prominent areas of science that challenge the principle of objectivity (and impartiality). Awareness of the indelible interrelation between subject and object, and, in the case of the evaluation field, between evaluator and evaluand, is crucial to understanding how we do what we do in the process of doing it. The claims of impartiality and objectivity that have oriented approaches and hands-on work in science are chimeras that do not stand up to scrutiny, to careful work on human cognition and action, or to reflexive professional experience in evaluation. Thus, while objectivity is a basic tenet of H1 science, it has no place in the scientific foundations of H3.

To say the least, given the challenges to objectivity, evaluators can drop the common claim of "being unbiased" when presenting evaluation work, in favor of a sensible and detailed account of the experience of evaluating what is being assessed, including the process of designing, implementing,

and delivering the evaluation work, acknowledging their influence rather than claiming impartiality.

How could one possibly claim objectivity in any domain of life, professional or not? Objectivity claims can be made on the basis of agreed-upon circumstances, concepts, and procedures. It is not external to the dynamics of human interactions in the contexts of their lives.

Causality and Interrelated Systemic Behavior

Causality is an uncomfortable topic in evaluation in the era of unprecedented, interlocked planetary challenges and the rise of systems thinking. The discomfort arises because evaluation commissioners typically require a straightforward confirmation of the success or failure of the projects, policies, and programs they sponsor, in the form of a clear and linear causal relation. Interventions are often conceived under the belief that, if properly designed and implemented, their target will move in the planned direction and change as foreseen. At a later stage, these interventions are evaluated and rely on isolated, immediate, linear, and causal relations. These are typically expressed in the theory of change charts embedded in the initial projects or proposed by the evaluator in the preparation for the evaluative work. These approaches align with the H1 science tenets.

Using the H3 systems science grounding toward the transformational imperative, evaluators must understand that attributing causal relations to proposed projects does not align with the historical, dynamic, and interrelated characteristics of systemic behavior. The primary concern should instead be to reveal the complex, interconnected, and recursive behavior of systems beyond simple cause-and-effect models. First, evaluators are invited to conceive of evaluation as part of the system they will engage with in their work, because it affects the system from the initial negotiations over the evaluation design onward (Ofir et al., 2019). Moreover, evaluators are invited to observe that changes in one system may trigger changes in interrelated systems, which can account for changes distant in space and time, not apprehensible through conventional, univocal, and immediate causal relations (Magro & van den Berg, 2021, p. 376).

The systemic approach we are adopting here highlights a cascade of interactions that trigger changes depending on the structural characteristics of the interrelating systems at the moment of interaction, their histories of change, the systems they interact with, and the moment of observation.

As a result of this differential interactive dynamic, systems exhibit progressively more complex behavior. As a systems thinker, an evaluator notes the interdependencies within observed systems and highlights ongoing movements that trigger changes that are not always expected or desired. Evaluators know from experience that when confronted with unexpected results or outcomes of policies, projects, or programs under assessment, these results are often labeled as imperfections in the initial projects or their implementation, ignored as unwanted consequences, or dismissed as invalid. This understanding signals that potentially important systems-oriented information is being lost, under the pressure of H1 canons.

Is this shift in the scientific foundation a significant challenge to evaluators? In many aspects, yes: (a) commissioners, managers, and citizens usually expect a narrow and straightforward answer from evaluators, who are now able to see changes as the result of a historical dynamic of interacting systems; (b) evaluations are usually time-bound, and there is no time available to appreciate the cascade of changes triggered (not specified) by an intervention in distant times and places; (c) evaluands are often restricted to one sharply defined system; and (d) the contexts of the evaluands are not perceived as systems themselves. Nevertheless, they are also historical and dynamic phenomena, simultaneously modifying and being modified by the systems they interact with. Recognizing and working with others to reframe thinking using this H3 science perspective is an important aspect of evaluative practice. The claim that *contribution* is valuable when we do not know how a system functions is rooted in a machine-based systems thinking approach (INTRAC, 2017a). It largely fails to encompass the understanding of social-ecological systems (Parsons et al., in press). Such claims too easily lead to misinterpretations of systems and subsequent actions.

An example of addressing the matter of contribution *differently* is the use of the outcome harvesting framework (Wilson-Grau, 2015; Wilson-Grau & Britt, 2013; INTRAC, 2017b). It avoids the utopian affirmation of causality in any of its multiple forms (for an overview of operational uses of the idea of causality, see van den Berg, 2024, Chapters 9–11). Outcome harvesting is particularly suited to complex situations where the cause-and-effect relationship is unclear or where there are doubts about the involvement of many different factors contributing to the observed change. It opens up opportunities to learn about systemic change as a transformational imperative.

Doing Science in a BANI World

The polycrisis context also highlights the challenge to a central condition for successful scientific work under the H1 scientific tenets: the stability of observation conditions. Stability is closely related to, and indeed enables, replicability and predictability, which were identified here as two fundamental characteristics of the dominant view of science (see Figure 1). The prevailing Western perspective on science has acquired widespread prestige throughout history through tradition, power, and the promise of prediction and control. It relies on the firm agreement that scientists reach by systematically, clearly, and logically applying principles and procedures in a scientific inquiry, in such a way that others can replicate it, and its results allow for prediction. Although predictions as outputs and replicability are possible in controlled, stable conditions and predefined analytical units, these are not the conditions of one's experience, nor of the polycrisis. Recognizing the limitations of these conventional assumptions is crucial as evaluators, researchers, and policymakers ground their work in the more relevant system-science tenets with the H3 situation. This acknowledgment can inspire them to question and expand their approaches.

From a systemic scientific perspective for the transformational imperative, replicability and predictability are not foundational scientific tenets. Understanding and addressing systemic change requires moving beyond assumptions of static stability and external control over observational circumstances. Understanding complex, dynamic systems demands embracing instability and unpredictability. Early systems thinkers had advanced from assuming static stability to expecting to see stable dynamics. Social systems have displayed historically observable patterns of behavior/change over time (Meadows, 2008). However, today, the unprecedented planetary imbalance exhibits uncommon patterns of change that need to be understood and treated as an unusual, unstable, and undesirable systemic dynamic, driven by historically exploitative, unhealthy, and unsustainable human actions. The rapid planetary environmental disarray, with biodiversity loss, geological disasters, and dramatic climate change, has exposed the deep-seated interconnectedness of the systems we belong to and the crucial historical dynamic that must be accounted for by sciences in general and evaluation in particular (see O'Brien et al., 2024; International Science Council, 2023a, 2023b).

While most evaluators and users of evaluation recognize that these conditions of stability are far from being observed in any place where they act professionally, they too easily assume that instability and variation can be overlooked. This oversight risks neglecting the opportunities for systemic transformation, thereby undermining efforts to address current challenges. Conditions of stability, replicability, and predictability privilege a type of science and a scientific paradigm that focus on well-defined interventions or initiatives established by an entity with power (e.g., a funder or government) to shift toward a desired future. In the language of the 3H initiative, this would be an H2- intervention, one that pulls movement backward to past inappropriate practices, rather than being an H2+ intervention that moves toward the desired transformative future.

Evaluation as a Scientific Endeavor

To contribute significantly to the transformational imperative expressed in H3, the science supporting evaluation must not be constrained by the assumptions of objectivity, causality, stability, and related assumptions of Western science. They lead to H2- interventions, whereas H2+ interventions are grounded in emergent systems sciences that engage recursiveness, nonlinearity, and multiverse epistemologies without subject-object disconnections. In writing these considerations, we aim to emphasize the profound interconnectedness of critical reflections on science with the reinvention of thinking and action toward a regenerative, resilient, and sustainable future.

H2+ interventions do not necessarily need to promote stability or depend on it, nor do they need to ensure consistency of results. Transformation is about profound systemic change, evident locally and at a distance, in the short, medium, and long term. This calls on evaluators to see their work as a catalyst for meaningful change, inspiring a shared commitment to shaping a just, regenerative, and resilient future through systemic influence. This means that a desired future, which we can characterize as just, regenerative, and resilient, involves influencing interactive dynamics that may dismantle or reduce one type of system while building others.

The conventional Western science that privileges the stability and consistency of results also supports a social system whose power and privilege must be diminished for transformation to occur. The collapse of harmful aspects of one system will be disruptive, which is not necessarily a bad thing. Recognizing this disruption as a systemic

step can help evaluators feel purposeful and resilient as they navigate change. What we now identify as deleterious needs to give way to an understanding of observed events as a flow of structural changes proper to the history of the interactant systems, with a different kind of consistency, a pattern of flexibility and change, leveraging diversity, encouraging the emergence of new ways of functioning, and producing distinctive results that give evidence of transformational change.

Evaluators can play many roles. This adds complexity in recognizing and using a multiplicity of legitimate ways of undertaking science, given the current unstable and unpredictable scenario, overcoming the fundamental divide between human and nature, questioning objectivity and classic rationality, and considering a fresh understanding of human cognition, in reference both to the neurosciences' development and to distinct epistemologies lived by the variety of societies that inhabit the planet.

Action for the H3 Transformative Imperative

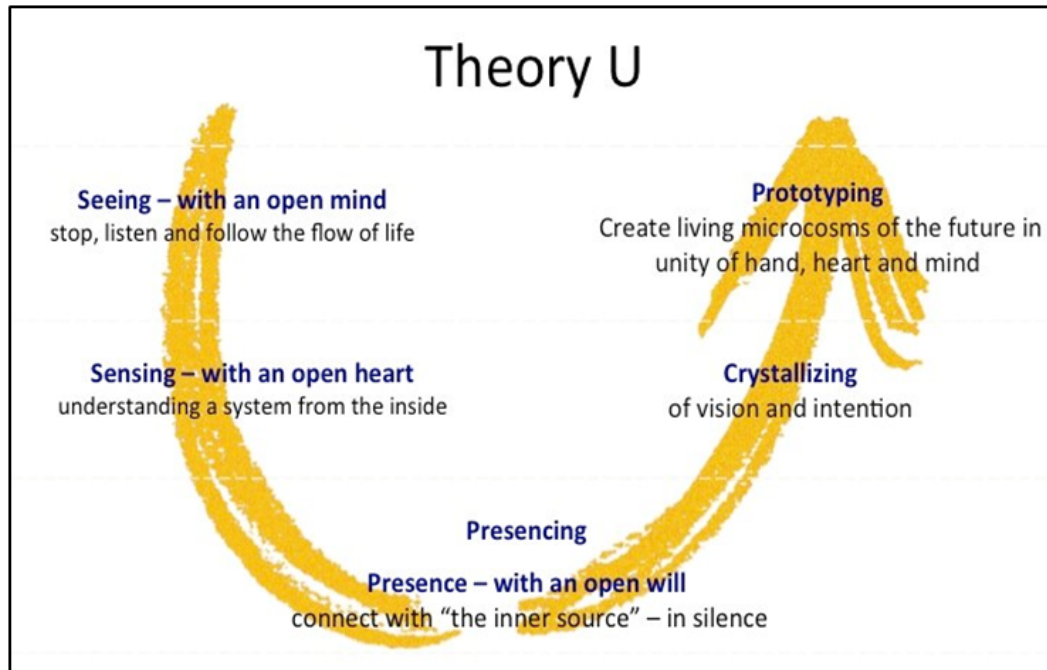
One way to support individuals or groups in changing their scientific presuppositions for evaluation is to engage them in changing mindsets and methodologies grounded in theory and practice. A practical and effective methodology for changing mindsets and raising awareness is Theory U, proposed by Scharmer (2016, 2018). Theory U states that our institutions are characterized by three divides—the ecological, the social, and the spiritual—that fail to express our life experience, leading to enormous failures. Essential changes are required, and these need to be rooted in a new consciousness, an awareness of the inner place from which our attention and intention originate. This is consistent with Maturana's radically systemic ideas.

Scharmer's U process proposes that we consciously access the inner blind spot of our attention and intention and learn to connect to our deepest source of knowledge and inspiration. It is thus a methodology for the change process, letting go of ingrained, conventional ideas about science and evaluation (in our case) and opening space for new orientations (Figure 3). In the language of 3H, this would be an H2+ intervention that deeply engages people in an intentional process of moving away from the H1 scientific assumptions, toward those congruent with H3 as we currently understand it. The U process is a methodology for continuous critical reflection and creative action, in

which the changes we bring about are coherent with our inner motivations and a broadened understanding of science, including how it can

address evaluation challenges and foster systemic change.

Figure 3. Theory U Diagram



Note. *The U Process* by Scharmer (2016) p. 7, Berrett-Koehler.

The Theory U methodology exercise in evaluation consists of letting go of H1 science assumptions in thinking and practices, and entering a space where the evaluator (with others, most likely) looks anew at a situation, bringing in the perspectives of the full range of stakeholders they have experienced, and creating a pilot approach to evaluating a situation that can build toward H3. The practice becomes one of continual letting go of previous assumptions; that is, letting go of their grip on what is narrowly considered legitimate science and/or evaluation to be able to open new possibilities and perspectives that enhance the movement to the H3 future of evaluative practices. The base of the *U* is the liminal space, the period between past reality and a future one, where one opens to sources of inspiration, motivation, and will, to change scientific assumptions and consequent practices toward those that support the H3 future. As one moves up

the right-hand side of the *U*, one prototypes something new to explore with others, doing, iterating, and learning together. This cocreation brings clarity to the vision and intention, while recognizing that creating living microcosms of the future that unite hand, heart, and mind involves continual imagination, prototyping, and evolving into new practices to bring into the world. It invites curiosity and shared discovery, fostering a sense of collective progress and innovation.⁴

In using Theory U or other methodologies, consider designing evaluations that address both constraining and/or reducing the power of the H1 system and building up features of the H3 system through emergent and creative dynamics. These prototyping systems can rebalance humanity and nature toward a just, regenerative, and resilient system. The focus would be on the practical steps to constrain one type of system and expand the other. Clarifying these steps helps practitioners translate

⁴ See the Presencing Institute's website, <https://www.presencing.org/theoryu>, for examples and further elaboration of the concepts here.

systemic concepts into concrete evaluation actions that support systemic change.

It is essential to recognize that not everyone may immediately value balancing just, regenerative, and resilient systems. Acknowledging diverse perspectives and concerns fosters mutual respect and understanding and reinforces the need for clarity in arguments and thoughts. Do not ignore those who are losing power and privilege. They are part of the transforming system that is finding a new way of being. Including their voices can strengthen collective commitment to systemic change.

Wrapping Up and Inviting New Conversations

The dominant scientific approach in Western societies operates systematically, applying procedures aimed at prediction and control. It is supported by, among others, the myths of objectivity, causality, stability, and the value of reductionism as a means of grasping essences precisely. It assumes the existence of an independent and external reality shared by all humankind, unaffected by observation or the observer, and independent of the multitude of social groups' historical struggles and ways of living, thinking, and acting. This view of science often marginalizes Indigenous and alternative epistemologies, reinforcing a narrow scientific worldview. In the reflection proposed here, what counts as empirical evidence and rationality finds new possibilities. The proposed comprehension encompasses an indisputable connection between humans and nature and among all living and nonliving entities, realms historically set apart in reductionist, objectivistic science.

Evaluators' world is enlarged and enriched by the emergence and recognition of a diversity of social groups (including, but not limited to, Indigenous ones) whose epistemologies have been silenced and who have been historically devalued, delegitimized, marginalized, and considered "nondeveloped." Evaluators' newly configured world also challenges the dominant sense of progress, justice, values, and worldview that represent the H3 transformation. Appreciating these epistemologies can make undervalued groups feel respected and open-minded, encourage the value of different ways of knowing, and foster effective sustainability strategies.

This apparently chaotic scenario named polycrisis, is a promising opportunity for creative actions and the configuration of a sustainable life, promoting healthy social-ecological systems.

Bringing about diversification as a sign of wealth and creativity positions us to bravely open our minds to a plurality of epistemologies and ways of living. Doing so paves the way for a brighter future we can build together, excavating the past and present, and the rich repertoires of ideas and lessons we can rightly use.

Although luminaries of the evaluation field like Michael Scriven (1993) and Michael Patton (2019) argued that evaluation is appropriately placed under the conventional scientific tradition, this paper rejects these fundamental science concepts as part of the scientific foundation for dealing with the daring planetary situation the evaluation field faces and replaces them with an emergent systems science foundation. It does not add emergent systems sciences to the previous ones; rather, it replaces them. This is a fundamental difference that demands concerted effort from evaluators and from the whole of society. The review of basic tenets of science in the proposed direction opens new possibilities for moving away from the widespread positivism still dominant in sciences and welcomes a decolonized (and contra-colonial) theory and practice in evaluation and beyond.

Organizations such as the International Science Council (2023a, 2023b) and IPBES (O'Brien et al., 2024) have stated that conventional science is insufficient to address the sustainability challenge and have made visible efforts to replace its enduring foundations. Our contribution to these and other efforts is presented in this paper, and we acknowledge that further exploration of evaluation is needed to complement the work developed here.

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