Foundations of Archdisciplinarity

Advancing beyond the meta

Arc

Foundations of Archdisciplinarity: Advancing Beyond the Meta

△ArC
www.arc.voyage

Foundations of Archdisciplinarity
Advancing Beyond the Meta

Cory David Barker, PhD candidate of Cognitive Science & Information Technology, University of Jyväskylä

Brendan Graham Dempsey, Yale Graduate, Religion and the Arts, Independent Scholar

Dr. Nicholas Hedlund, Professor at California Institute for Human Science & Director of Eudaimonia Institute

Dr. Sean Esbjörn-Hargens, Dean of Integral Education & Integral Noetic Sciences Program Director

Johan Ranefors, LTH Graduate, Computer Science and Engineering (M.Sc.Eng.), Independent Scholar

Paul Poledna, PhD candidate, University of Vienna

Dr. Michael Kleineberg, Library and Information Science, Freie Universität Berlin

Dr. Bruce Alderman, Integral, Religious, & Philosophical Studies, John F. Kennedy University

Dr. Gregg Henriques, Department of Psychology, James Madison University

Scout Leider-Wiley, Independent Scholar

Abstract

Archdisciplinarity is here introduced as the academic inquiry that treats big picture, transdisciplinary, theory of everything, unification metatheories as units of analysis for comparison and contrast. In this booklet, we first describe the purpose and motivation for formalizing the notions of archdisciplinarity. Next, we examine historical to contemporary contexts of the evolution of human understanding through scopes of academic inquiry – disciplinarity, interdisciplinarity, transdisciplinarity, with archdisciplinarity as the next-higher order scope of academic inquiry. This is followed by an articulation of scopes of propositional frameworks that explain phenomena – theory, metatheory, and unification metatheory, with archtheory as the next-higher order theory that follows. Archtheories are described as syntheses across unification metatheories along their common themes called arches. We give several examples of arches that are intrinsic to and persist across the meta of most comprehensive and integrated models in the world. The booklet continues with an account of sociocultural sensibilities – premodernity, modernity, postmodernity, and metamodernity, with archmodernity proposed to follow. After grounding our topic in the literature, we then lay out the foundations for archdisciplinarity by describing a) criteria for what constitutes unification metatheories, b) the means for how to classify unification metatheories, and c) a path forward for coordinating study and practice at this scope of inquiry. Three archdisciplinary methodologies are presented for different purposes, with one describing community collaboration, another describing application of archdisciplinarity to upgrade existing scopes of theory, and one describing the procedure for how an arch was originally derived, which prompted the conception of archdisciplinarity. After that, we will describe the mission of the Archdisciplinary Research Center (ARC), and what we anticipate going forward. We bring this booklet to a close with some discussion of the topic, and some concluding remarks.

Keywords

Table of contents

Introduction

Purpose

The purpose of this booklet is to present the first publication about this newly emerging scope of academic inquiry called archdisciplinarity. This booklet serves first as a historical to contemporary account of our topic, and second as an account of the state of affairs. In giving a historical to contemporary account of our topic, we give reason for the existence of archdisciplinarity as a natural progression in the ever-widening scope of academic inquiry by grounding it in both conceptual and terminological lineages. In terms of giving an account of state of affairs, this booklet describes the creation of the Archdisciplinary Research Center (ARC) and it's mission. We, the authors of this booklet, plan to publish similar state-of-the-field booklets periodically as annual reviews as this field grows.

Motivation

We put forth the notion that the metacrisis is not just a crisis of meaning for the general public in this "time between worlds" (Stein, 2019), but is also a metacrisis occurring amongst those who operate in metatheoretical and unification metatheoretical landscapes. While such big picture approaches attempt to draw a big circle around, synthesize, and hold all human knowing and doing into coherent

frameworks, they have limitations in explanatory and influential power and demographic reach. Furthermore, both ironically and tragically, the authors and communities who champion different unification metatheories have not unified with each other on the global front to face our species' contemporary challenges in any kind of comprehensive, organized way.

Extinction rates are estimated up to 1000% higher than any time in the history of the world specifically due to human impact, and we've lost 69% of all wildlife on earth in the last 50 years (see IPBES, 2019; WWF, 2022). We are reaching criticality with global warming (WMO, 2022). 8.5% of the world population live in extreme poverty (Hasell et al., 2022). A staggering 29% of the world population (2.3 billion) face food insecurity, with 828 million people going hungry, 345 million experiencing acute hunger, and 9 million people starve to death yearly, with 3 million of them children (Grember et al., 2022; Concern Worldwide, 2022; UNICEF et al., 2021). 160 million children are being exploited in child labor worldwide (UNICEF & ILO, 2021). As of May 2022, over 100 million people are displaced by war (UNHCR, 2021; 2022). Nearly 10 million people die from cancer annually (Roser & Ritchie, 2019). Civil unrest increased by 10% in 2021, with the economic impact of violence increasing in 2020 to $14.96 trillion which is equivalent to 11.6% of the world's GDP or $1,942 per person in military spending (Institute for Economics & Peace, 2021).

As ancestors of the future, we have to ask what kind of ancestors we want to be. We have the most integrated, comprehensive, coherent models of the world and universe available to us. We already have many answers for how to solve our species' challenges spread across our collective works, and strong leads to follow where we do not. While there have been some pocket cases of individuals and groups exploring this uncharted frontier of the space between unification frameworks, there has not been a formalized naming of this space and organizing about this at the scope and scale that's required to turn the tide. Many have been on the front of making the world better, but we can do better, *we must do better.* Thus, this booklet is a call to action for those who have and operate with unification big picture frameworks: *we must put aside our differences, combine our collective intelligence and collective works, and cooperate to find and implement real world solutions to these kinds of challenges.*

This booklet seeks to establish foundations for how we can start working together across unification frameworks. This is not something that can be done alone by any one person, institution or conglomeration – it can only be a collective global effort built on trust, mutual respect, and determination. We believe through both faith and reason that the combined comprehension and strengths across these unification frameworks will unlock crucial insights and capacities to foster global flourishing in a way never before done, that global collective coordination is possible, and that success is *obligatory*. In our species' ever-incrementing improvements of symmetrical representations of ourselves, our world, and our universe, archdisciplinarity is one further step on this road towards building more comprehensive theories and practices.

Topics

What we have to do is first establish the grounds in which to go forward, establishing a common understanding and common language for which we can understand each other and communicate across frameworks. In the first section entitled *Advancing from Transdisciplinarity*, we introduce archdisciplinarity as a neutral, non-denominational term to describe a depth, breadth, and scope of academic inquiry that continues one step further in the natural progression of the established academic lineage of disciplinarity, interdisciplinarity, and transdisciplinarity. In the second section entitled *Advancing from Metatheory*, we introduce the concept of archtheory and give explanation how archtheory builds on metatheories in the same way that (unification) metatheories have built on theories, and describe how archtheory is distinct from (unification) metatheory and yields new insights that cannot be generated from any (unification) metatheory alone. In the third section entitled *Advancing from Metamodernity*, we describe the notion of archmodernism and conjecture about the sociocultural sensibilities we anticipate it will involve. The final section is entitled *Archdisciplinary Research,* and discusses a) foundations of archdisciplinary research, b) ways to classify transdisciplinary works, c) what coordinating archdisciplinary (arch)theory and (arch)practice can look like, d) proposed archdisciplinary methodologies, and e) anticipated outcomes of the archdisciplinarity research project – the challenges that we anticipate archdisciplinarity can help solve.

Advancing from Transdisciplinarity to Archdisciplinarity

Disciplinarity

There are historical contexts to the use of the term *disciplinarity*, and many scholars' definitions of *interdisciplinary* and *transdisciplinarity* have diverged from their original meaning by those that coined them, often using the terms as though they are interchangeable. We here focus specifically on the origins of the terms, and diversifications of their use that enrich them.

Moran (2010) states that disciplinarity has two uses; first that it refers to a particular branch of learning or body of knowledge, and second that it refers to the maintenance of order and control amongst subordinated groups such as soldiers, prison inmates or school pupils. Moran states that from the beginning, the term was caught up in the relationship between knowledge and power and implies hierarchy and the operation of power. A cross-reference to etymology finds Moran's depiction to be accurate. Historically, the term "discipline" was entangled in religious and

nationalistic affiliations reflective of the eras in which the term was used. The term originates from the Latin *discipulus* which meant "pupil" and *disciplina* which meant "instruction given, teaching, learning and knowledge", then later the Old French *descepline*, meaning "physical punishment, teaching, suffering, martyrdom", likely in context of monarchical feudalism.

The Old English *þeodscipe* was defined as a "branch of instruction or education", where *þeo-* or *theo-*, again, indicates religious overtones to notions of organized higher learning (Etymonline, 2022). We can see this also in dictionary definitions. Collins English Dictionary (2006) defines discipline first as "training or conditions imposed for the improvement of physical powers, self-control", second as "systematic training in obedience to regulation and authority" and third as "the state of improved behavior, etc, resulting from such training or conditions", and not until its sixth definition does it arrive at "a branch of learning or instruction". In contrast, Webster's Third New International Unabridged Dictionary (2002) defines discipline first as "teaching, instruction, tutoring", and secondly as "a subject that is taught", with the etymologically rooted definitions moving further to the back of the line.

Gibbons & Limoges (1994) defines disciplinarity as traditional knowledge, with a primarily cognitive context, that it is a complex of ideas, methods, values, and norms that have grown up to control the diffusion of the Newtonian model to more and more fields of inquiry and ensure its compliance with what is considered sound scientific practice. Squires (1992) describes disciplinarity as having to do with three things; addressing of problems relevant to its topic, methods used, and the extent for which it treats its own nature as the subject of reflexive analysis. Where a discipline is given to reflexive analysis, a discipline can be improved. Biglan (1973a, 1973b) makes reference to disciplinarity as having three elements; a paradigm, application of knowledge, and focus on living objects of study. Lattuca (2001) defines disciplinarity as powerful but constraining ways of knowing, and that as concept frames, delimit the range of research questions that are asked, the kinds of methods that are used to investigate phenomena, and the types of answers that are considered legitimate.

We can summarize and consolidate these definitions by saying that a discipline constitutes a theory and a practice for a given domain, and it needs to be useful.

Disciplines typically have a paradigm which on the one hand helps address problems that a disciplinary approach is fitted to treat, but on the other hand there is an influential power of sense making that disciplines can have on an individual or group that share their experience, and a limitation to the scope in which a given discipline reaches. Where two or more disciplines are interrelated, this is what constitutes interdisciplinarity.

Interdisciplinarity

Interdisciplinarity as a term seems to have first been published by Ogburn and Goldenweiser in *The Social Sciences and their Interrelations* (1928) to refer to the activity of interrelating different disciplines in social sciences. This term was employed by Yale's Institute of Human Relations in 1929 in the interest of social welfare, drawing from a diversity of disciplines to help in their mission. The basic dictionary definitions carry the earliest intended meaning of the term forward, such as the New International Unabridged Dictionary (1986) defining interdisciplinarity as "characterized by participation or cooperation of two or more disciplines of fields of study", and Random House Dictionary (1998) as "combining or involving two or more professions, technologies, departments, or the like, as in business or industry".

Mansilla defines interdisciplinarity learning as "a process by which individuals and groups integrate insights and modes of thinking from two or more disciplines or established fields to advance their fundamental or practical understanding of a subject that stands beyond the scope of a single discipline, and that interdisciplinary learners integrate information, data, techniques, tools, perspectives, concepts, and/or theories from two or mores disciplines to craft products, explain phenomena, or solve problems in ways that would have been unlikely through single-disciplinary means" (Frodeman et. al. 2010).

Gibbons and Limoges (1994) describe interdisciplinarity as "characterized by the explicit formulation of a uniform, discipline-transcending terminology or a common methodology. The form scientific cooperation takes consists in working on different themes, but within a common framework that is shared by the disciplines involved". Repko & Szostak (2012) say that the interdisciplinarian "studies a complex problem (including mega ones) by drawing on disciplinary insights (and sometimes

stakeholder views) and integrating them. By employing a research process that subsumes the methods of the relevant disciplines, interdisciplinary work does not privilege any particular disciplinary method or theory".

There are similar terms like interdisciplinarity that have been proposed, such as cross-disciplinary (Nubiola, 2005; Sumner & Tribe, 2008) and multidisciplinary (Youngblood, 2007; Alvargonzález, 2011). While there are often similarities in how such terms are defined, interdisciplinarity is the most widely used. Where the widening of the number of disciplines integrated into interrelation to such a degree that any or/and all disciplines can be included, this results in what is called transdisciplinarity.

Transdisciplinarity

Though frameworks existed historically that reflected transdisciplinary endeavors before the academic term was introduced, the etymological root of transdisciplinarity was coined by Jean Piaget in the late 1960's. Piaget said of transdisciplinarity: "Finally, we hope to see succeeding to the stage of interdisciplinary relations a superior stage, which should be "transdisciplinary", i.e. which will not be limited to recognize the interactions and or reciprocities between the specialized researches, but which will locate these links inside a total system without stable boundaries between the disciplines" (Nicolescu, 2010). Transdisciplinarity is usually not found in dictionaries. Where dictionaries do have definitions, they are like Collins English Dictionary (2006), "pertaining to or involving more than one discipline; interdisciplinarity," further compounding a confusion between what makes transdisciplinary distinct from interdisciplinarity. Outside dictionaries however, there are many definitions in the literature that follow from Piaget, and we'll look at some here.

Nicolescu (2008) describes transdisciplinarity as "that which is at once between the disciplines, across the different disciplines, and beyond all disciplines. Its goal is the understanding of the present world, of which one of the imperatives is the unity of knowledge" (also see Nicolescu & Ertas, 2014). Repko & Szostak (2012) says the same of transdisciplinarity and that "Its goal is (a) the understanding of the present world, of which one of the imperatives is the unity of knowledge, and (b) the solution

of mega and complex problems by drawing on and seeking to integrate disciplinary and stakeholder views on the basis of some overarching theory". Gibbons and Limoges (1994) describes this transdisciplinarity as "knowledge production carried out in the context of application and marked by its: transdisciplinarity; heterogeneity, organizational heterarchy and transience; social accountability and reflexivity; and quality control which emphasizes context-and use-dependence. Results from parallel expansion of knowledge producers and society".

Thus, transdisciplinarity is an academic term used to describe the relations between interdisciplinary relationships, where the interlinks, when fitted together, are found to express an overall unity across the various disciplinary and interdisciplinary theories and practices.

Archdisciplinarity

In the 1980's, several organizations were formed around the theory and practice of transdisciplinarity, for example the *International Center for Transdisciplinary Research* (CIRET) established in 1987 (CIRET, 2012), and the *International Society for Knowledge Organization* (ISKO) established in 1989 (ISKO, 2021), among others. There was a recognition that there were characteristics of transdisciplinarity that hold across transdisciplinary theory and practice, namely the logic of the included middle, levels of reality, and complexity (all of which will be described below in the section on archtheory). Rather than establishing a distinct name for the comparative study and identification of properties across transdisciplinary works, the properties found to hold across transdisciplinary models were absorbed into the notion of transdisciplinarity itself, or through the lens of a particular transdisciplinary approach. Here, we propose that the move from looking through the lens of one transdisciplinary approach to reflecting on and describing properties that hold across transdisciplinary models in general is a departure point into a higher order of coordination and understanding than the transdisciplinary models themselves. Thus the recurring properties found between transdisciplinary models, should be considered as a part of a more broadly encompassing academic inquiry not biased in any existent transdisciplinary approach, which we here term archdisciplinary.

Concepts about coining a word and establishing an organization that treats transdisciplinary models as units of analysis at a higher order of organization, arose between Barker, Görtz, and Ranefors in 2016 (personal communications). Since Barker was beginning a PhD program, and Görtz was writing *Nordic Ideology*, they decided to put the project on hiatus until their independent work was further along. Later, Barker made a formal proposal of archdisciplinary terminology in a lecture video in June 2019 on the *Architectonics* YouTube channel (Barker, 2019c), while Görtz described the next step beyond metatheoretical work as necessarily being a social endeavor that is co-created (Hedlund & Esbjörn-Hargens, 2023). Dempsey began a video series called *Metamodern Spirituality* in April 2019, examining big picture models through the lens of where science, spirituality and individual and social evolution intersect (Dempsey, 2019). Another approach to surveying the field across theories of everything appeared in October 2019 by Curt Jaimungal on the *Theories of Everything* YouTube channel through a physics and mathematics approach (Jaimungal, 2019). The following year in August 2020, Barker would more fully elaborate on Görtz's *Metamoderna* forum, expanding on definitions of the terminology, where archdisciplinarity was defined "the academic field of study that studies unifying, transdisciplinary studies about all fields of study", archtheory as "arcs [arches] that persist through recursivity of meta-theories and the theories that meta-theories theorize about," and archmodernity as "an era of arch-disciplinary and arch-theoretical social philosophy" (Barker, 2020). Henriques responded to this post on the same thread, pointing out similarity to his notion of the fifth joint point (see Henriques, 2011a; 2011b). In November, Henriques launched a YouTube channel *UTOKing with Gregg,* where he podcasted dialogues with metatheorists about their work in this shared space (Henriques, 2020a).

In the same time frame, Alderman and Pascal began a podcast on the YouTube channel *The Integral Stage,* where similarly to Jaimungal, they began interviews with metatheorists, exploring what Pascal called the metaphysics of adjacency between meta-models (Alderman & Pascal, 2020). Poledna made contact with Barker in early 2021, inquiring the common traits between Barker's architectonic of simulation and Landry's immanent metaphysics, prompting them to make contact with Landry to do a full one-to-one comparison across their respective metatheories. Barker, Henriques, Görtz, Ranefors, and Poledna would then establish *The Archdisciplinary*

Research Center (ARC), offering invitations to those mentioned above, among others, and registering a nonprofit organization (www.arc.voyage).

Archdisciplinarity is a term we introduce here to advance from Piaget's notion of transdisciplinarity, where we hope to succeed even one step further, achieving reciprocity between transdisciplinary theorists towards an even further total system that goes beyond the boundaries between transdisciplinary models.

Archdisciplinarity is here defined as the academic inquiry that treats transdisciplinary, big picture, theory of everything, all-encompassing, unification metatheories as units of analysis for comparison and contrast in search of their common traits so that they can be accounted for, described, and put into order. Archdisciplinarity is intended to be a neutral concept that represents a specific scope of academic inquiry in the same way that disciplinarity, interdisciplinarity and transdisciplinarity are concepts used to describe their respective scopes of academic inquiry. We propose to call theories resulting from and populating this scope of inquiry *archtheories*.

Advancing from Metatheory to Archtheory

Theory

The etymological roots of the word *theory* comes from the Greek *thea* "a view", *theōria* as "contemplation, speculation, a looking at, viewing; a sight, show spectacle, things looked at", *theōrein* "to consider, speculate, look at," and would later take the shape of the Late Latin *theoria* as "conception, mental scheme", and by the late 15th c. "principles or methods of a science of art" (Etymonline, 2022).

There is enough consensus in the academies such that an elaborate series of references isn't needed to root what a theory is in literature. A theory is simply an idea or proposition about what is true supported by evidence. There are different words we use to describe ideas in terms of how much evidence there is to support them. We generally place these words on a spectrum between least to most evidence as the following: opinion, hypothesis, theory, law, and absolute truth. An opinion is an idea that is without any evidence at all, or describes a personal preference. A hypothesis is an idea put forth with some evidence that it could be true, but with the acknowledgement that an idea needs more evidence and needs demonstration that an idea or proposition is shown true. A theory is an idea or

proposition that has been demonstrated with evidence where the demonstration is clear and can be replicated by others to verify it. A law is an idea that has been repeatedly demonstrated by numerous independent parties and has been shown to hold up soundly against attempts to discredit it. Absolute truths are infallible facts, which is what the academic acquisition of knowledge seeks to ultimately identify. Without such a clear coherency of this spectrum, one may conflate opinions and hypotheses as being theory, law, or an absolute truth, such that one may believe ideas or propositions are true without having demonstrated with evidence.

Metatheory and Unification Metatheory

Historically, *meta-* derived from Greek, meaning "after, behind, among, and between", as well as "changed, altered" and "higher, beyond". The latter definition as being "higher than, transcending, overarching, dealing with the most fundamental matters of" derives from meta- being borrowed from it's association to metaphysics as a science that transcends the physical, and its application to other domains (Etymonline, 2022).

Though widely used in contemporary times, the coining of the term *metatheory* could not be located in the literature in the writing of this booklet. Yet metatheoretical thinking has been an ever-present thread in the realm of philosophy towards reflecting on and understanding the relationship between parts, processes, and patterns intrinsic to reality, as well as how to properly respond to them. We can trace metatheoretical notions as far back as the Greeks such as in Socrates, Plato, and Aristotle. Furthermore, natural sciences, the humanities, mathematics, and other fields of study as we know them today were born of earlier, less empirically sophisticated schools of thought such as astrology, alchemy, and numerology. This has been described in the examinations by Jung (2014), Faivre & Needleman (1993), and Goodrick-Clarke (2008). Metatheories and theories of everything can be traced to earlier schools of integrative, large-scale thinking from proto-psychological models such as the nordic map of the soul (Paxson, 2012), to metaphysical theories of everything linking the cosmic to the mundane, such as the tree of life in Jewish mysticism (Luria & Gruberger, 1969), the *Mirror of All Nature in Utriusque Cosmi Vol.1* (Fludd, 1617) and the Matthäus Merian engraving from *Opus Medico-Chymicum* (Mylius, 1618). Even the evolutionary/transformative stages of

renaissance alchemy bears a degree of resemblance to contemporary developmental models. For example, we may compare the behavioral transition dynamics modeling found in the model of hierarchical complexity (Commons, 2008) with Jung's analysis of what he termed the transcendental function in alchemical transformation, expressive of underlying psychological processes (Jung, 1963; 2014). Anecdotally, we find that proto-metatheory in mystical and esoteric traditions have largely been left out of academic conversations of metatheoretical knowledge and wisdom, despite their clear historical impact on culture, politics, and education.

While there is a long history of theories that could be considered metatheoretical, the formalization and institutionalization in recent history can be traced to a chain of events beginning with Cantor's infinite sets influencing Hilbert to propose an open question regarding the consistency in mathematics, which led Gödel to devise the completeness and incompleteness theorems (Gödel, 1929, 1931). Gödel's proofs led scholars to seek the limits of their favored formal systems by applying a respective formal system on itself. This ushered in metatheories such as meta-computation (Turing, 2012/1938; Church, 1940), meta-set theory (Fraenkel et al., 1973), meta-logic (Kusko, 1993; Newel & Simon, 1956; Carnap, 1934), meta-linguistics (Chomski, 1956), meta-language (Tarski, 1936), meta-semantics (Briar, 2013), as well as metatheoretical formalities of organic chemistry (Chandler, 2015; 2017), non-metaphysical meta-physics (Hawking, 2002), and science in general (Kuhn, 2012/1962; Mathen, 2005). This also ushered in postmodern sensibilities, as no metatheory and the formal language it was generated from could sufficiently represent itself, whereas each proposition of truth always required a higher order scope beyond the system that produced the proposition. Sociocultural postmodern sensibilities will be accounted for and described in the postmodern section further below.

Metatheory as a term used to describe "a super-theory built from overarching constructs that organize and subsume more local, discipline-specific theories and concepts" (Stein, 2010) came much later during the late 20th and early 21st century. For decades, as above described, metatheory originally meant a theory about a theory specific to a given domain, but metatheory as a term eventually came to include the definition of a theory that synthesizes multiple theories, such as found in transdisciplinary, integrative, theory of everything kinds of models. For example, in

the Blackwell Encyclopedia (2007), Ritzer writes that a metatheory is a broad perspective that overarches two or more theories. Overton (2007) carried this further, depicting theories as existing along a hierarchy of scope in terms of how much a theory encompasses, between polarities of including one domain and several. Overton describes metatheory as also having this hierarchical dimension as a scope of inclusivity. For Overton, the pinnacle was constructing a metatheoretical worldview. Later, Edwards (2013) would identify four aims for metatheoretical research: 1) reviewing theories to gain understanding of their core characteristics, 2) for the preparation of constructing an improved theory, 3) an overarching theory that integrates multiple theories, and 4) using a metatheory to evaluate theories. While Edwards does not give an account for how metatheory evolved from Cantor and Hilbert, the first two aims of metatheory he gives, accounts for the historical lineage above described, and the last two definitions extend to include the etymological transformation of further definitions arising in the late 20th to early 21st century.

There is a distinctive difference between metatheory and *unification metatheory*. What Overton describes as the widest scope of inclusivity, and what Edwards describes as that which integrates multiple theories in the widest sense, are what we here term *unification metatheories*. Unification metatheories can be both interdisciplinary and transdisciplinary, where in some cases a unification metatheory is the result of the attempt to unify everything known across *some* disciplines interdisciplinarily within a given scope such as found in Hawking's physics model (2001) and Miller's living systems model (1978). Yet in other cases, transdisciplinary unification metatheories are different in that they aim to unify across *all* known disciplines, such as with Wilber's integral theory (2001) and Henriques unified theory of knowledge (2022). The reason we don't use the term "integrative metatheory" as described by Edwards, Esbjörn-Hargens and others, is because integrative metatheory has strong associations to Wilber's integral theory, and we want to establish a neutral term to describe unification models at this scope and scale that does not require those employing such a term to infer ideological commitments. The metatheories of specific interest to archdisciplinary inquiry are self-referential metatheory, and various forms of unification metatheory both within and across disciplines.

Archtheory

Here, we will give some examples of archtheoretically relevant literature and concepts, primarily by order of historical appearance, and secondarily by associating historical appearances to other relevant unification metatheories in order to give examples of arches.

Universal computability

Gödel had demonstrated that where a formal system is consistent, it cannot also be complete. This is because where consistency is demonstrated, it requires a new axiom not previously contained within the formal system to explain its consistency. This results in an infinitely recursive procedure of adding new consistency statements as new axioms, where there is always found to be a greater system in which a formal system belongs (Gödel, 1929, 1931). Historically, many people have taken the position of a postmodern sensibility that a theory of everything could never graduate to a system of absolute truths. However, it turns out that the problem was resolved almost immediately after it was described.

Alan Turing in his PhD dissertation *A System of Logic Based on Ordinals* (2012/1938), demonstrated that by repeatedly applying Cantor's transfinity to axioms, some axioms can indeed be shown to hold across complete and incomplete states of a formal system if the logic is sufficiently high enough in the hierarchy. As Turning described it, where there is a system of logic L, and a more complete system L' may be defined, this results in a repeating procedure such as $L, L_1 = L', L_2 = L_1'$ with each iteration more complete than what preceded it. He stated that a logic L_ω can be constructed in which provable theorems are the totality of theorems provable across $L, L_1, L_2...L_n$. In this way, a system of logic can be shown across any ordinal order of logic across Gödel iterations. Turing included in his dissertation the notion that due to the transfinite nature of this, it required intuition to fully grasp, and that there was still a matter of unaccounted variance.

It later was shown that general recursivity was an absolute truth and ω-consistent, that is, omega-consistent (Turing, 1937, Kleen, 1938, Rosser, 1936; Sieg, 2006; Copeland, 2004). Church, who supervised Turing's dissertation, went a step further

with lambda calculus. Lambda calculus was a general theory of types that allows any given formal system to be represented through abstract types, operators, and functions (Church, 1936; 1940). What Church did was demonstrate properties that hold across all formal systems, where generalized types and operators can persist through the recursions of any formal system. This holds true for meta-mathematics, meta-logic, meta-semiotics, and so on, such that in any domain, it will be found that there will be recursivity, types, operations, and functions all here named *arches*, and will persist at every Gödel iteration. This discovery of properties of universal computation was the genesis of what here we coin an *archtheory* – a theory that consolidates and builds on the properties that hold across metatheories. Despite popular belief, the computational model of cognition was not modeled after computational machines, but rather it was that computational machines were modeled after fundamental arch properties of human cognition.

Turing in his 1936 paper *On Computable Numbers* (1936) described how these universal properties could be implemented into machines. Between 1945 and 1947, Turing designed the automatic computing engine at the National Physical Laboratory in the UK. Later, Von Neuman carried forward on this design and advanced it further with a blueprint for an electronic discrete variable automatic computer (Von Neuman, 1993/1945; 1981). What they and others since have done, is effectively extract high ordering properties, and implement it into machine design. Thus, the profound usefulness of archtheory in practical application has already been demonstrated – the implementation of high order properties into the foundational architecture of computational machines have vastly transformed every area of human life, allowing us to compute anything we can imagine, from simple text editing to simulating entire galaxies that can be explored in virtual reality. With the right know-how and the right hardware, anything people can imagine can be implemented through computer simulation precisely because computers run on the same universal properties of human cognition itself (and quite possibly the universe). Indeed, we here put forth that the digital age and everything it made possible has occurred precisely on account of an archtheory – it is only that we haven't had enough clarity to put it into context until now.

Integrative levels

In the same timeframe as the universal computation was being discovered, another trajectory of integrating metatheories was occuring. Needham (1937) coined "integrative levels" and described properties of complexity and organization. James Feibleman published his paper *Theory of Integrative Levels* (1954), where he synthesized the metatheoretical work of Bertalanffy's *Modern Theories of Development* (1938) and *An Outline of General Systems Theory* (1950), with Novikoff's *The Concept of Integrative Levels in Biology* (1945). As a result of this synthesis, Feibleman described twelve laws of levels: 1) Each level organizes the level or levels below it plus one emergent quality, 2) complexity of the levels increases upward, 3) in any organization the higher level depends upon the lower, 4) in any organization, the lower level is directed by the higher, 5) for an organization at any given level, its mechanism lies at the level below and its purpose at the level above, 6) disturbance introduced into an organization at any one level reverberates at all the levels it covers, 7) the time required for a change in organization shortens as we ascend the levels, 8) the higher the level, the smaller its population of instances, 9) it is impossible to reduce the higher level to the lower, 10) in organization at any level is a distortion of the level below, 11) events at any given level affect organizations at other levels, and 12) whatever is affected as an organization has some effect as an organization. Feibleman was attempting to fit together different metatheoretical approaches that all shared a common thread of observation.[1]

Complexity

Later, in the 1980's, Michael Commons with others, constructed a universal stage model proposed to hold across behavioral domains that ordered stages of human, organism, and machine behavior along an ordinal trajectory, called the Model of Hierarchical Complexity (Commons, Richards & Armon, 1984). The model, which grew out of behaviorism and mathematics, describes 17 increases in complexity (Commons & Jiang, 2014b) with further higher stages proposed (Commons 2023, in preparation). Each order of complexity corresponds to an underlying behavioral

---

[1] For those who are computer scientists, we find integrative levels taking expressions in machine code as tuples, arrays, matrices, and the embedded layering of them.

form that occurs as a natural consequence of the upward stacking of coordination which he calls stage – behavioral forms which appear to recur in the same sequence across domains. Using modern abstract algebra, Commons defined five axioms as 1) well-ordered, 2) transitivity, 3) the chain rule, 4) the coordination rule, and 5) equal spacing, as well as formal definitions and emergent properties about hierarchical complexity (Commons et al., 2014a). The model includes a concise description of stage generation as one moves from one order of complexity to the next higher order, called transition dynamics. Commons describes transitions as combinatoric, building on Piaget's description of stage change, converting Piaget's model into mathematical notation and improving upon it (Commons, 2002). Gödel, Turing, and Church's work was not influential in the onset of the model of hierarchical complexity, but was in later formalizations (Commons, 2014c).

In the model of hierarchical complexity, stages are defined by orders of complexity. Orders of complexity have horizontal and vertical complexity. Horizontal complexity is how many actions exist at a given order of complexity, and vertical complexity is how many stacks of horizontal complexity are coordinated to complete a given task, where a higher order of complexity is defined by the successful coordination of two or more actions at the next-lower order through the transition dynamics. The model of hierarchical complexity is here considered archtheoretical because it defines behavioral stages that concisely define the properties of coordination of unification metatheories and archtheories (via the meta cross-paradigmatic stage and ultra stage, respectively) and does so through integrative levels, complexity, and exhibits universal computation in the transition dynamics. Vertical complexity is essentially a trajectory of integrative levels, and Commons' hierarchical complexity model has been shown to hold across any domain of human knowing and doing in which it has been applied. Other notions that describe the universal computation of complexity can be found in notions of holons (Koestler, 1967; Wilber, 2000b), mereology (Surma et. al., 1991), systems theory (Capra, 1996), cybernetics (Wiener, 2019/1948), and fractals (Mandelbrot, 1982).

Fracticality from universal computation across integrative levels

Fractals are self-similar patterns, where characteristics of the whole are reflected in the characteristics of the parts and vice versa, and are described in both

quantitative and qualitative contexts. Fractals were first shown to be pervasive throughout nature, coined by Mandelbrot (1982). Fractals have been further described in many other domains, such as physics (Mandelbrot, 1984; Calcagni, 2010; Coleman & Pietronero; Pietronero & Tosatti, 2012), electrodynamics (Jaggard, 1990), earth sciences (Turcotte, 1989; Barton et al., 1995), organism physiology (Weibel, 1991), and neurology (Alexander & Globus, 1996; De Ieva, 2016). Fractals also show up in cognition and behavior. Sara Nora Ross was the first to point out that properties of transitions between orders of behavioral complexity were indeed fractal (Ross, 2008; 2014).

Fractals calculate along repeating self-similar patterns and produce levels. Barker, in his master's thesis (Barker, 2013) under Commons and Ross's supervision, showed that 1) Gödel's theorems were natural properties of human behavior and can be directly mapped to stage transition as described by Commons and Ross in a fractal way, where the first half of the transitions (equilibrium, complementation/negation, and relativism) describe the relationships between complete but inconsistent coordinations, and the second half of the transitions (the smash transitions) find consistency between coordinations where both are shown to be incomplete, 2) the model of hierarchical complexity's ordinal system of stratifying increased complexity was a real world expression of Turing's system of logic where recurring properties of coordinations – the behavioral forms of a given stage – are retained through multiple domains of a cognitive system, and 3) recurring properties of stage transitions were analogous to the notion of universal computation (recursivity of units, relations, and systems of relations, where systems of relations become units at the next higher level and then the process repeats).

To account for nonlinear complexity, and building on Commons' notion of downward assimilation, Barker introduced diagonal complexity to describe where output actions occurring at any order of complexity of behavior can be coordinated as the input of any other order of complexity of behavior, and defined nonlinear axioms to complement the linear axioms Commons et al. had proposed. Ultimately, Gödel's theorems are found to be a variation of expression about natural evolutionary processes of stacking behaviors becoming more complex – a realization that Gödel, Turing, Church and others could not ascertain because the state of the field of behavioral complexity and psychological development had not yet matured to

discover the patterns until the latter part of the 20th century. For Barker, self-similarity of qualitative characteristics was present, but underrepresented in the literature. An example Barker gave was for physics – though the instantiated expression differs from one level to the next, each level of the physical building blocks of matter consists of a repeating self-similar pattern of substances, forces, and configurations, where configurations can become a new kind of substance, which becomes increasingly complex from the embedded substance mixtures (Barker, 2013).

The included middle (transjectivity)

A further example in the literature that appears archtheoretical is found with Nicolescu in his paper Methodology of transdisciplinarity (2010), where he defined axioms and properties of transdisciplinarity. For axioms, he describes three: 1) the ontological axiom, 2) the logical axioms of included middle, and 3) the complexity axiom. The ontological axiom states that for both nature and society there are different levels of reality of objects and subjects which are invariant under certain laws. The logical axiom of included middle states that the passage from one level of reality to another is ensured by the logic of the included middle where a third term T exists at the same time between A and non-A, where there is a more inclusive system in which A and non-A are shown to fit together somehow, for example between levels of reality and between objects and subjects. The complexity axiom states that the structure of the totality of levels of reality or perception is a complex structure where every level is what it is because all the levels exist at the same time. Nicolescu defines horizontal complexity as a single level of reality, vertical complexity as several levels of reality, and transversal complexity as the crossing of different levels of organization at a single level of reality, similarly to Commons notions of horizontal and vertical complexity (Commons, 2008), and Barker's diagonal complexity (Barker, 2013). The notion of properties existing similarly between both objectivity and subjectivity are found in the mutual-discovery and surprisingly samely named transjectivity, found in Barker (Barker, 2019a; 2019c) and Vervaeke (Sweeny, 2020). The included middle also has expressions in Henriques's iQuad coin (Henriques, 2021a; 2021b; 2021c) and Landry's metaphysics (Landry, 2009/2002).

Ontological pluralism, methodological pluralism, and universal grammar

Sean Esbjörn-Hargen (2015) described boundary-crossing approaches, building from similar notions as Overton and Edwards, by describing four orders of synthesis, starting with 1) disciplinary theories within specific fields, 2) integrative theories which integrate everything known within a domain or integrate multiple domains, 3) integrative metatheories (what we here call unification metatheories) which strive to include all domains, and 4) complex integral realism which finds commonalities across integrative metatheories, and builds a model from their commonalities. Here, our archdisciplinary distinctions are that Esbjörn-Hargen's second order is what we call interdisciplinary unification metatheory, the third order as transdisciplinary unification metatheory, and consider the fourth order of synthesis called complex integral realism to be archtheoretical because it is the coordination across several unification metatheories, finds their commonalities, and models them.

Esbjörn-Hargens proposed that the fragmentation of the academy into disciplinary niches and the complete integration of human knowledge into an omega point would be the primary polarities of the 21st century. Esbjörn-Hargens led engagement and research between authors and proponents of these forms of metatheory, which he termed meta-integrations and integral metatheories. Complex integral realism was constructed from the synthesis of Ken Wilber's *integral theory*, Roy Bhaskar's *critical realism*, and Edgar Morin's *complex thought*. Complex integral realism is described as "an amalgamated post-formal integral metatheory committed to integral pluralism" and "amalgamated in the sense that it is largely the result of combining the strengths and unique contributions of three distinct integral metatheories" (Esbjörn-Hargens et. al., 2015).

Some of the commonalities Esbjörn-Hargens and others found, was that each of these models included vertical complexity as accounting for stratifications of reality, horizontal complexity as accounting for the subjective and objective interpretations of what occurs at various levels of the stratifications, and distinguishing between 1st, 2nd, and 3rd person perspectives. He stated that they all point towards an irreducible nature of reality and provide highly inclusive metaviews across the widest range of humanity's insights. He also proposed that they include the best insights from modernity and postmodernity, yet go beyond them. And last to be

mentioned here is that these models shared in common an emphasis on both individual and social emancipation, plantetcentric awareness and action with global scope and scale.

Esbjörn-Hargens and others (2016) accounted for commonalities and differences along three meta-frameworks, which we here update to call arch-frameworks or arch-systems. These three frameworks were 1) the ontological domain lattice, 2) tetradynamics, and 3) the integral pluralism matrix. The first part, the ontological domain lattice, crosses the ontological strata of the real, the actual, and the empirical, over the ontological dimensions of physical systems and ontologies, social and cultural ontologies, and psychological ontologies. This produces nine domains of ontological inquiry, a means for showing the relationships between ontological plurality. The second part, tetradynamics, compares metamodels along four dimensions of reality – experience, behavior, culture, and systems – a quadrification of interior/exterior and individual/collective across unification models that define perspectives or methods of knowing, often referred to as methodological pluralism. Esbjörn-Hargens states that these dimensions show up the strongest between Wilber's AQAL (All Quadrants, All Levels) and Bhaskar's Four-Planar Social Being, and though not explicit in Morin, show up across his work. The third part, integral pluralism matrix, takes the grammar-associative 6Ws model of who, how, what, when, where, and why, and applies them to the analysis of describing properties across the plurality of all-inclusive metatheoretical models. These questions reference fundamental properties across the models, e.g. "what" directs us to analyze the ontology of a metatheory, and "how" directs us to analyze the methodology. This is essentially a move towards universal grammar and understanding how certain grammatical properties underpin the means in which theory of frameworks are oriented. It's worth noting here that other variations of well-organized methodological pluralism frameworks are found in many places elsewhere, not just in Wilber's quadrant model (Wilber, 2000a; 2007), but also, for example, Kellert et al's *Scientific Pluralism* (2006), Davies' *Epistemological pluralism* (2006) and Miller et. al's *Epistemological Pluralism* (2008).

In 2013, Bruce Alderman, who was part of Esbjörn-Hargen's complex integral realism research team, proposed an expansion upon Ken Wilber's AQAL's unification metatheory, which Alderman called *integral grammatology*. Alderman noticed

persistent tensions among various, similarly sophisticated philosophical and metatheoretical approaches appeared to trace to fundamental differences in their respective ontological commitments beyond their perspectival (four-quadrant) focus. Alderman (2019) articulated a meta-metaphysical (archtheoretical) model for situating and correlating philosophical and metatheoretical approaches according to their primary and secondary metaphysical commitments by taking the six major parts of speech – nouns, verbs, pronouns, adjectives, adverbs, and prepositions – as *philosophemes*, i.e., as onto-epistemological elements correlated with substance, process, perspectival, aspectual, modal, and relational metaphysics, respectively. These philosphemes are a strong candidate for being arches and archtheoretical, since they describe intrinsic properties that hold across theory of everything models in the very foundations of theory of everything modeling composition.

Substance (nounal) and process (verbal) metaphysics are long-established and well-known, especially in the West. Perspectival (pronounal) approaches are less common, but trace at least as far back as Abhinavagupta's grammatico-theology, with modern exemplars in Peirce, Habermas, Schumacher, Wilber, among others. Modal (adverbial) and relational (prepositional) orientations also have been underemphasized in Western history, with a number of exceptions, but are now coming to the fore in the work of Whitehead, Souriau, Serres, Latour, and others.

In the book *Also/Perhaps* (forthcoming), Alderman and Pascal contend that adverbial and prepositional approaches especially are important for the trans- and archdisciplinary demands of our age, as we seek (prepositionally) to a) identify equivalencies across paradigms or metaphysical topologies (Panikkar, 1999), b) to enact syn-integral bridges in organizational studies (Küpers, Deeg & Edwards, 2015), c) to interlink and braid modes of existence (Latour, 2013), and d) to trace out and operationalize connective differences (arches) across and among competing/complementary metatheories. An adverbial approach might orient around, not only the Big 3 of the Good, True, and Beautiful (as adverbial attractors), but also around the 6Ws core to Edwards' (2010) and Esbjorn-Hargens' (2016) metatheories.

For the 2015 Integral Theory Conference, Alderman (2016) used the prepositional lens to articulate an (arch)theory of interreligious and intercultural relationship,

especially for the purposes of the theme of the conference to trace out the complex interrelationships of integral theory, critical realism, and complex thought, and to prepositionally frame their respective approaches to religious pluralism, nonduality, and the logic of the included middle.

In summary, integral grammatology argues for the importance of developing the art 'onto-choreography' – of making an (arch)disciplined practice of identifying and circulating the grammatical philosophemes in the enactment of metatheoretical spaces. Such practice, for instance, often yields insight into the Klein-bottle like relationships among fundamental metatheoretical elements. The whole of integral grammatology might be seen as filling out the 'What' of the 6Ws; but the 6Ws are conversely only one aspect of one element of integral grammatology (the adverbial).

Ruliad and singularity

Another strand of inquiry that can be considered archtheoretical is Wolfram's notions of the ruliad and multi-computation (2021). The initial ideas explored in the Wolfram Physics Project are generalizations of a model presented by Wolfram (2002) in *A New Kind of Science*. Spacetime is represented as an evolving hypergraph where replacement operations that function on set systems determine the dynamics of the hypergraph. The conformal structure of spacetime is expressed by a causal graph (Gorard, 2020). While the general approach shares similarities with formalisms like causal dynamical triangulation, aspects of loop quantum gravity and twister theory (Ashtekar & Pullin, 2017; Loll, 2019; Huggett & Tod, 1994) certain generalizations of the above mentioned method share similarities with archdisciplinarity inquiry.

Wolfram (2021) differentiates four different approaches central to the sciences. These are structural, mathematical, computation and multi-computation. Computational approaches investigate the structures generated from recursive rule following, where simple rules can generate irreducible complexity (Wolfram, 2002, Mandelbrot, 1982). It is central to the advances made in complexity theory and its various areas of application including self-organization, collective behavior,

networks sciences, evolution, nonlinear dynamics and game theory (Farley and Clark, 1954; Goldstone and Janssen, 2005; Bäck et al., 1997; Schelling, 2006).

Multi-computation is the non-arbitrary coordination of rule-following done from the computational paradigm. While rule following within computation happens in accordance with a fixed set of rules that are recursively applied to generate a linear sequence of states for a given system, multi-computation generalizes this process by allowing different rules to update any given state, creating multiple threads of history. It is a generalization of rule-following that need not restrict itself to a fixed set of rules but considers the simultaneous application of various rules onto a given state of a system. Another way to conceptualize the shift from the computational to the multi-computational is to invert the relationship between a rule and the system it generates by looking at the latter. As Poledna (2022) argues, these are advancements that move from modeling based on complex, emergent and often self-similar patterns towards concepts where multiple such (meta)models co-exist, overlap, and are in a superposition of one another.

Hence, certain symmetries hold between multi-computation and archdisciplinarity. This is due to the reason that both look for non-arbitrary coordinations of lower order meta-conceptual elements. For multi-computation, this is the kind of rule following creating complex systems, while for archdisciplinarity it is the coordination of transdisciplinary theories. It is further interesting to note, that the type of coordination presented through multi-computation is likely a fertile ground for considering the coordination of arches, not based on mutually exclusive updating sequences, but rather on super-positioned and overlapping coordinations.

Wolfram defines the Ruliad as "the entangled limit of everything that is computationally possible: the result of following all possible computational rules in all possible ways", and applying the same rule to all possible states (2021). Once again certain similarities to archdisciplinarity become apparent in considering the space of all possible rules and their interactions. In some sense the Ruliad is akin to a more reductionist approach where all individual possible computational rules are considered, whereas archdisciplinarity takes composite sets of rules, found in various theories and metatheories as a starting point to investigate arches that hold across them. An analog to the Ruliad can also be found in Barker's architectonic of

simulation, where he defines universal classes in the trajectory of behavioral complexification, two of which are of interest here – that of phasic and deitic ratiocination. For Barker, phasic ratiocination is defined as a process of the coordination of a fundamental property (arch) across all-encompassing panoptic (unification metatheoretical) systems, (arch) relations between these fundamental properties, and (arch) systems of these properties. Barker proposes that this is followed by deitic processes, that is, a singularity from a phasic system, relation between singularities, and systems of singularities (Barker, 2023).

Gregg Henriques, author of the Unified Theory of Knowledge (UTOK) proposes a notion he terms *the fifth joint point*. Henriques describes four joints that precede it, that of energy-matter, life, mind, culture (integrative levels). In *A New Unified Theory of Psychology* (2011), Henriques states that as Kurzweil argues in *The singularity is near* (2005), we are at the cusp of a phase transition – the fifth joint point – as a new human epoch because of the information age and electronic computational technologies. He noted that Kurzweil acknowledged similar epochs as material objects, living objects and brains, with the following epoch as technology. Henriques puts forth that this next epoch is not just a technological singularity, but also an epistemological one, and gives support for this notion by describing ways of knowing through natural sciences, social sciences, the humanities and others as justification systems that are in need of synthesis towards a scientific humanistic worldview, which his unified theory describes. Henriques accounts for the science wars between modernists and postmodernists as a symptom of the fragmented pluralism of justification systems among the academies of the sciences.

How Henriques arrived at this, was from his examination of the problem of psychology and the fact that the field lacks a coherent subject matter, leading Henriques to create a unified theory of psychology (a meta-psychology). Henriques uses the map of cosmic evolution provided by his theory of knowledge system to show how to align psychology with the dimension of mindedness that exists between living organisms and cultured persons. Henriques posits that UTOK can provide a fundamental shift in the way our onto-epistemological structures (what we believe is real and how we arrive there) are organized. He argues that the current state of our knowledge is in a chaotic fragmented pluralism and stuck between modernist and postmodernist sensibilities that stem from the failure of the

Enlightenment to generate a coherent scientific philosophical system that could place the qualitative subject in right relation to the objective facts of science. He posits that UTOK achieves this missing synthesis, and with it we can move from the current state of chaotic fragmented pluralism into a more coherent integrated pluralism. He argues that with such a synthesis, we will be able to effectively navigate the fifth joint point into the next dimension of complexification that follows the Culture-Person plane of existence. For Henriques, justification systems consist of semantic, analytic, evidentiary, subjective, social and moral elements, and that through a proper understanding of justification systems through this lens, we can bridge the chasms. The bridging of this chasm leads to an epistemological singularity, the fifth joint point. Henriques uses a metaphor for this, the elephant sun god (Henriques, 2020b), and states that the fifth joint depends on what he terms *ultimate justifications* which can only be found by resolving the fragmented pluralism through a methodological pluralism.

Integrative levels revisited: Architectures, processes, and the universal classes that populate them

The above proposed trajectory of universal classes such as matter, life, and mind as found in Kurzweil and Henriques, also show up in other unification metatheories. Kleineberg in *The blind men and the elephant* (2013) advocates for the need to organize the plurality of epistemic contexts in a systematic way in order to avoid the threats of epistemic relativism, such as a fragmentation into incommensurable ways of knowing. In his account of historical attempts to resolve this challenge, Kleineberg observes two seemingly universal patterns that often function as organizing principles: 1) pluralistic ontology (architectures), and 2) developmental epistemology (processes).

The first pattern Kleineberg identifies is related to a pluralist ontology that distinguishes at least three categorically irreducible domains, such as the objective, the subjective and the intersubjective. This is reflected, for example, by Karl Popper's (1980) three-world ontology distinguishing between physical world 1, mental or psychological world 2, and cultural world 3; by Jürgen Habermas' (2003) formal pragmatics distinguishing between objective world, subjective world, and social world each constituting their respective validity claim of truth, truthfulness, or rightness; by Søren Brier's (2008) knowledge areas of nature, spirit, culture; and by

Günter Dux' (2011) physical world, inner world, and social world. This pattern is summarized by Ken Wilber (2000b) as the "Big Three" and can be related to the universally valid system of personal pronouns in terms of third-person, first-person, and second-person perspectives, which is apparently the reason why it is acknowledged across many theories and metatheories.

The second pattern Kleineberg identifies is related to a developmental epistemology that distinguishes invariant levels or stages of learning and knowing abilities, such as increasing cognitive or communicative competencies of individuals and collectives. The sequence of stages can be described as integrative levels of knowing since each later stage integrates and preserves the abilities and competencies of the previous stage, while adding something new. Such developmental epistemologies can be rationally reconstructed for a broad range of domain-specific competencies in both individual development (Kohlberg & Hersch 1977; Fischer 1980; Kegan 1982; Cook-Greuter 2013; Piaget, 2013/1950) and collective development (Habermas, 1984; Dux, 2011). Kleineberg in *Integrative levels of knowing* (2021) offers a comprehensive overview covering more than 60 stage models from fields like developmental psychology, comparative psychology, developmental sociology, social anthropology, neuroanthropology, cognitive archaeology, philosophy, religious studies, cultural studies, environmental studies, organizational management, literature history, and art history. As shown by metatheorists like Habermas (1984), Commons (2008), and Wilber (2000a), the various stage models related to developmental epistemology can be correlated with each other in overarching models to the extent that they follow the same pattern of development. Stages describe universal behavioral forms that define the character in which cognition takes shape and how an ontological representation of reality is updated and transformed.

Within the integrative levels, there are proposed universal classes that populate large scale integrative levels, which generally take the form of *what exists* (architectural), and *how things behave* (processes). Examples of universal architectural classes of *what exists* beyond Kurzweil and Henriques can be found in Feibleman (1954), Hartmann (1953/1942), Rolston (2010), and Barker (2019a; 2019c; 2023). Kleineberg gives an exhaustive list in *Integrative levels* (2017). Examples of universal process classes for *how things behave* are generally oriented towards the evolution of organisms between individual and collective levels, for example in

natural science of Darwin (1909) and Skinner's environmental epigenetics (2015), and social sciences as found in Commons (2008), Fischer (1980), Wilber (2000a; 2007), Kegan (1986), Young (2011), as well as Murray and O'Fallon (2020). An attempt to propose universal process classes for behavior that holds for both living and nonliving entities in the universe are more rare, for example in Barker's process ratiocinators (2019a; 2019c; 2022). For example, Barker proposes a process class called transduction, which describes input-throughput-output action units, relationships between these action units, and network systems that result, where such a class has the explanatory power to account both for organismic sensorimotor stages, computational circuits in machines, and tensor fields in physics. Other proposals for universal processes are found in Azarian (2022) where he describes universal evolutionary processes that hold across physics, biology, and psychology (Azarian, 2022), and Ranefors (forthcoming) notion of non-human-centric generation of objectivity. The presence of these kinds of universal class frameworks relating to what exists and how things behave suggests an allusion to the arch-system of universal computation, where unification models, to some scope or scale, focus on describing universal types (what exists), universal operations (how things behave), or/and the functional relationship between both (universal computation).

Recent and upcoming archtheories

Archtheoretical efforts to translate a synthetic vision of such multi-level, unification metatheories into a mythopoeic register includes *Emergentism* (Adyahanzi & Dempsey, 2022), which unites Azarian's unifying theory of reality (UTOR) and Henriques's unified theory of knowledge (UTOK) through a metamodernist (or perhaps archmodernist) lens to fashion a novel religion-like framework of iconographic symbols, scriptural texts, and spiritual practices. *Omega* (forthcoming) is Dempsey's culmination of this archdisciplinary mythopoeic project. Written in an illuminated manuscript style reminiscent of Carl Jung's *Liber Novus* (Jung, Shamadasai, et. al., 2009), it renders the story of cosmic evolution and the complexification of Matter, Life, Mind, and Culture into a blank verse scripture-like epic. The aim of such works is to translate the insights of numerous unifying metatheories into a more aesthetic language of myth and symbol for a broader audience outside of academia.

Hedlund (2021) proposes an integrative metatheory 2.0 (here termed an archtheory) called *visionary realism.* In an effort to contextualize the metacrisis at large, Hedlund assesses metatheory in it's geo-historical context, and fits together Bhaskar's critical realism and Wilber's integral theory, using hermeneutical dialectics and immanent critique towards a non-preservative synthesis of aspects of both unification metatheories. He applies this visionary realist framework to analyze and synthesize philosophical, cultural, and psychological aspects of the metacrisis to identify key principles and holistic solution patterns to inform social transformation.

Ranefors (forthcoming) is working on an archtheoretical framework that describes how to update disciplinary, interdisciplinary, and transdisciplinary models along the arches of fractal complexity and integrative levels. His approach is described further below in the archdisciplinary methodologies section.

Arches across the meta

From the above examples, we here put forth the following arches that hold across the meta – 1) universal computation, 2) complexity, 3) fracticality, 4) the included middle of transject with object and subject, 5) 6w and universal grammar, 6) integrative levels and 7) universal architectural and processual classes that populate them, 8) ruliad and multi-computation, and 9) singularity. We propose these arches as reliable means for archdisciplinary comparison of unificatory metatheoretical frameworks. We also believe we have only scratched the surface of what can be discovered in this archdisciplinary space. What other arches exist, and how arches can be fitted together relationally and into systems is a matter for further archtheorizing. These are starting points at the onset of archdisciplinarity.

We propose that the anticipated technological singularity must necessarily proceed from an epistemological one and follow from archdisciplinary research. As described above, computational technologies came out of the archtheoretical universal computation frameworks derived from Princeton University scholars and others of the 1930's, and profoundly advanced our species technology, allowing us to vastly hasten the process of knowledge creation, dissemination, and application. Virtually all domains of human knowing and doing employ computer technologies.

We anticipate that the identification and application of arches, arch-relations, and arch-systems into new archtheories that hold across unification metatheoretical attempts to resolve ontological and methodological fragmentation will also have similarly high sociocultural impacts, both in machine-technological and psycho-technological ways. Next, we will explore sociocultural sensibilities and it's evolution in terms of where we came from, and where we are headed.

Advancing from Metamodernity to Archmodernity

Introduction to the topic

The most recent sociocultural sensibility has been metamodernism. Metamodernism is a multi-dimensional, post-postmodern paradigm that has come to prominence over the last ten years. In its most general sense, it refers to the distinct cultural logic that has emerged after postmodernism that, through a dynamic engagement with prior cultural logics, represents a distinct, novel structure of feeling and thinking. In its more expansive and developed articulations, metamodernism offers a comprehensive philosophical meta-worldview that situates and contextualizes prior worldviews into a non-arbitrary sequence, allowing for optimal integration of a plurality of psycho-cultural modes and strategies as well as a metanarrative based on this endeavor.

The first to identify this new post-postmodern cultural logic were two Dutch cultural theorists. Timotheus Vermeulen and Robin van den Akker (2010) articulated

metamodernism as a cultural phase comparable to its most immediate antecedent, postmodernism. The two thinkers drew on Raymond Williams's (1961, 1977) concept of a "structure of feeling" to help theorize this sensibility, as well as Frederic Jameson's (1991) idea of "cultural logic" to ground their analysis of metamodern cultural production. Specifically, they argued, what characterizes metamodernism as a sensibility is the novel way that it engages *both* typically modernist *and* typically postmodernist attitudes.[2] The "meta" here thus captures simultaneously both the essence of the "between" (*meta* in Greek), but also the "beyond" (also *meta* in Greek): metamodernism moves *beyond* postmodernism by the novel emergence of a new sensibility defined by a continual oscillation *between* the modern and postmodern. If modernism was characterized by an often naïve enthusiasm for utopian ideals, and postmodernism by a particularly self-aware suspicion or outright cynicism towards such ideals, the metamodern sensibility is uniquely able to maintain a dynamic coupling of seemingly paradoxical orientations *between* these possibilities, such as "ironic sincerity," "informed naivete," and "pragmatic idealism." Their assessment of metamodernism recognized a return of "grand narrative thinking" in this register and an exploration of universals after postmodernism's preoccupation with "micronarratives" and particularity.

Building off this initial articulation, sociologist Daniel Görtz and theory artist Emil Ejner Friis, writing under the pen name Hanzi Freinacht, considerably expanded metamodernism into a comprehensive philosophical paradigm with a more robust theoretical framework (Freinacht, 2017; 2019). In this view, metamodernism as a cultural phase represents only 1 of 6 dimensions of what we might mean by the term as 1) a cultural phase, such that the work of Vermeulen, van den Akker, and other academics remain vital and important. However, metamodernism is *also* 2) a stage of cultural evolution, 3) a stage of personal development, 4) an abstract

---

[2] Vermeulen and van den Akker identified this sensibility at work in a slew of cultural artifacts appearing in the early 2000s (e.g., in the films of Wes Anderson, the music of Devendra Banhart, the writings of David Foster Wallace, etc.) which did not accord with the standard postmodern analytical rubric per se. Notably, this new cultural sensibility seemed to coincide with a growing geopolitical instability and ideological polarization, as the monopolar triumph of Western neoliberalism in the 1990s began to yield to large-scale system disruptions (e.g., global terrorism, the 2007 financial collapse, the growing ecological crisis, etc.) and as ideological struggles like Occupy Wall Street, the Arab Spring, and the Tea Party movement exposed profound rifts in the new world order. The "end of history" (Fukuyama), and the "sense of an end" (Jameson) more broadly had themselves come to an end, heralding a "return of history" at a "crisis-ridden moment" that stirred highly motivated action and activism.

meta-meme, 5) a philosophical project, and 6) a political movement (Freinacht 2021; cf. Henriques and Görtz 2020). In short, while accepting the notion of metamodernism as a distinct cultural sensibility, Hanzi shifts the emphasis from a merely descriptive theory to both a *prescriptive* and *normative* framework.

As such, metamodernism is not only the next movement in culture *temporally* (i.e., the way Modernism followed Romanticism, and Postmodernism followed Modernism, etc.), but *developmentally* and *logically*. In this way, metamodernism is not only different, but normatively progressive, since it integrates more of what came before.[3]

In this more expansive view, metamodernism is characterized by engagement with not only modernist and postmodernist stances (à la Vermeulen and van den Akker), but *all* the previous cultural logics. That is, to conceive of metamodernism as an oscillation between modern and postmodern sensibilities is too limited; we should rather see it as a *synthesis* of prior indigenous, heroic, traditional, modern, and postmodern cultural logics (or, what Hanzi calls the Animist, Faustian, Post-Faustian, Modern, and Postmodern cultural codes, respectively). Metamodern theorist Lene Rachel Andersen (2019) proposes something similar to this framing in her own work, *Metamodernity*, arguing that "metamodernism" is simply the artistic movement associated with metamodernity, where metamodernity itself represents a post-postmodern epoch wherein all the earlier cultural codes (indigenous, traditional, modern, and postmodern) find a harmonious integration and engagement. A sociocultural anthropological examination of evolutionary pressures that play a role in driving social evolution can be found in Johnson and Earl's *Evolution of Human Societies* (2000).

Because these more comprehensive articulations of metamodernism theorize the cultural logics as unfolding through dialectical synthesis, the progression through them represents a genuine evolutionary advance: that is, a normative sequence of stages that build necessarily on one another. Moreover, this cultural evolution mirrors the psychological development of individuals, which is why metamodernism is not only a stage of *cultural* evolution, but also a stage of *individual* development

---

[3] While the Dutch cultural theorists were keen to emphasize the *oscillatory* (not synthetic) nature of metamodernism in their theorizing, subsequent articulations take a more traditionally Hegelian approach, seeing metamodernism as a true logical dialectical synthesis of previous cultural codes.

as well. Here Hanzi draws upon developmental theory to articulate the logic to this progression, especially the work of neo-Piagetian theorist Michael Lamport Commons, whose Model of Hierarchical Complexity (MHC) offers a formalized stage theory based on a hierarchy of cognitive tasks ordered by complexity (Commons & Chen, 2014). Thinking of metamodernism as a stage (and not merely a period or phase) thus allows Hanzi to draw direct correspondences between the cultural codes and the MHC.

Table 1: Corresponding Freinacht cultural codes with Commons complexity levels.

Cultural Logic	Complexity Level (MHC)
Animist	Primary
Heroic-Imperial	Concrete
Traditional	Abstract
Modern	Formal
Postmodern	Systematic
Metamodern	Meta-Systematic

While it is true that some stage theories describe individuals and societies with overreaching generalizations, for many stage theories this is not the case. Many stage theories define distinct lines of development across different domains of human behavior, such as found in Commons (2014), Fischer (1980), and Wilber (2000a). Therefore, each of these distinct cultural logics along the developmental trajectory described above can be understood as an attractor point toward which a society gravitates when social organization is of a particular behavioral form and complexity. This is to say, a cultural logic does not define the ceiling of hierarchically complex behavior of a given culture, *only the general statistical mean* of behavioral complexity found among that culture. Cultural logics form both individually and socially as adaptive complexes to meet the existential challenges and opportunities

of different environmental niches. The worldviews that come to coalesce and cohere stably within unique social configurations thus represent certain equilibria attained by a collective of individuals navigating the complex interactions of a particular system. Such systems are defined as much by material limitations (e.g., access to and nature of specific resources and energy, etc.) as socially-constructed constraints (e.g., taboos, moral codes, laws, power hierarchies, etc.), and evolutionary pressures (that which is required to maintain homeostasis), which are themselves in a continuously dynamic, dialectical relationship. Sketched briefly, the sequence of cultural logics metamodernism recognizes might be summarized as follows below.

Premodernity

Animist cultural logic appears in societies organized along tribal lines, where strong authoritarian or centralized control is minimal or nonexistent, and relatively small populations cooperate to harness local energy resources via hunting or foraging. Ritual and taboo serve as critically important social regulators, and mediate relationships to existentially-significant biological events (birth, sexual maturation, death) and social activities (hunting, war, magic, spiritual development). Such mediation is deemed necessary to affect a proper orientation to powerful forces inhering in the world. Such forces may be highly personalized entities (souls, spirits, ghosts, ancestors) or more impersonal but highly active potencies of social significance to humans (e.g., *mana*). In the context of this animist worldview, the assurance of proper relationship to such forces presents a continual orienting factor to existence, and forms the impetus for most social cohesion via collective ritual. Adaptive values thus converge around deference to the broader collective, which includes the more mysterious forces at work in the environment.

Contemporary examples of this cultural logic can be found in some of the few remaining tribal societies today, presumably most so among so-called "uncontacted" peoples such as the Sentinelese of North Sentinel Island, the Jarawas of the Andaman Islands, the Toromona in Bolivia, the Nukak people in Columbia, etc. Ethnographies by anthropologists have tended to serve as the principal sources mediating information about such societies to Western audiences (not unproblematically). The assumption that the earliest human societies (beginning c. 10,000 BCE) operated according to this cultural logic (a long-standing consensus

among cultural anthropologists), however, has more recently become the topic of robust debate (cf. Graeber and Wengrow, 2021).

Heroic-imperial (or Faustian) cultural logic marks a break from the largely egalitarian, collective-oriented worldview of indigenous societies and instead emphasizes the powerful exploits of exceptional individuals. Centralization and authoritarian control emerge as aggressive agents assert themselves over the collective, establishing dominance hierarchies. Decentralized spiritual forces mirror this centralization tendency, becoming more localized in (usually anthropomorphic) deities worshiped at specific shrines and temples. Adaptive values thus converge towards self-aggrandizement and supplication of tutelary divinities for self-advancement. Agonistic struggle and competition determine worth, the chief social currencies being honor, glory, and power. Agriculture, plunder, and slave labor allow for the development of urban centers and a greater diversification of labor.

Historically, some notable emergences of this cultural logic include the rise of imperial kingdoms in the ancient Near East and ancient Egypt, led by military chieftains who were culturally interpreted as representing their pantheon's militant storm-god; the insurgence of Aryan "cowboy" raiders and proto-rajas in the Indian subcontinent, who flourished by theft and subjugating local tribes while propagating their rudimentary caste system hierarchy and worship of anthropomorphic power gods such as Indra; the rise of a warrior-based Mycenaean society in archaic Greece, whose glory-driven mores and anthropomorphic pantheon one sees reflected in the Homeric epics; the Viking raider culture that thrived off plundering their land-based neighbors during the mid-centuries of the first millennium CE; or the Shoguns in medieval Japan. Contemporary examples are relatively rare, since the dominance of post-imperial cultural logics, given their higher complexity, tend to dampen or otherwise redirect the energies of this logic. As a consequence, today it is largely limited to "failed-state" contexts where more complex social formations have broken down and warlords, mafiosos, and gang leaders become leading actors due to power vacuums/the breakdown of the rule of law. The rise of ISIS might be cited as one such recent example.

For *traditional (or Post-Faustian) cultural logic*, the "rule of law" just mentioned is crucial, which is characterized by a strong legalistic emphasis and commitment to abstract principles informing a moral order. Power or strength alone no longer serve

to justify authority, which is now subservient to and dependent upon a higher regime of transcendent ideals. The multiplicity of anthropomorphic, striving deities converge towards an even more singular Divine. Piety and righteousness are the marks of worth, and values converge towards fulfilling the duty of one's lot within the cosmic hierarchy. Guilt follows and deters from moral lapses, and fear of transcendent punishment maintains allegiance. Life is understood as a struggle, but ultimately purposeful, as right action and belief will lead to salvation or liberation and an ultimate reconciliation with the transcendent ideal. The organizational possibilities that open up as a consequence of unifying vast populations under abstract ideals fuel the complexification of society, with increased integration of greater diversity. Relatively complex social hierarchies emerge, and deepen considerably compared to the warrior-led structures of heroic-imperial society.

Historically, the transition from heroic-imperial logic to traditional logic is best attested in the so-called "axial age" transformation, a term coined by Karl Jaspers (1953) to refer to the period spanning between roughly 750 BCE and 250 BCE when, in surprisingly broad cross-cultural terms, cultural values shifted from dominance-driven to morality-driven ideals, and all the traditional "world religions" were first formulated. One sees instances of this in Platonic philosophy, for instance, wherein the inherited stories of heroic-imperialistic values enacted by the gods in Greek mythology (e.g., Zeus's rapes, Hera's vengeance, etc.) are critiqued on moral grounds, and divinity becomes both more transcendent and more centralized (e.g., nominally polytheistic thinkers like Socrates, Plato, and Aristotle referring to "theos" (God) in the singular). Such "rationalizing" of the old myths according to new, transcendent ideals continued into the Hellenistic period, with Philo of Alexandria representing its influence on Jewish thought, and a pervasive new "Logos" theology being emblematic of this turn. In India, one sees a similar reinterpretation of older, polytheistic Brahminic ritual along new, transcendental lines, as in the Upanishads and the Bhagavad Gita. (Divine) authority is now predicated on goodness, not mere dominance. Rulers in China are not above the law, but themselves subjects to the "Mandate of Heaven." In Europe, Kings rule as representatives of God on Earth, not as mere warlords. The moral order itself is what binds together the complexifying social fabric (e.g., Christendom for Christians; the ummah for Muslims, etc.).

Today, traditional cultural logic is pervasive. According to data from the World Values Culture Survey (2022), majority populations in dozens of countries, especially

those in the African-Islamic world and Latin America, report holding strongly to traditional cultural values. Many countries in the Global North also have large percentages of citizens who maintain a traditional worldview, correlated with high church affiliation and a politically conservative orientation.

Modernity

According to *modern logic*, appeals to a transcendent cosmic hierarchy are not sufficient to justify authority. Rather, direct observation, intersubjective verification, and reasoned argumentation must serve as the arbiters of universal truth: power's only legitimate source and aim. That which cannot be measured, tested, or deduced must be doubted. Only that which can be empirically shown to have real causal power can be taken as real. Values thus converge towards demonstrating utilitarian and pragmatic achievement. Wealth and consumption are celebrated, along with novelty and innovation. Life is understood as a contest, in which the smartest, most pioneering individuals succeed. Powerful new energies (steam, fossil fuels) are harnessed for industrial production at mass scales. Such production allows for the emergence of immensely more complex societal structures.

Historically, despite earlier emergences in Greco-Roman culture and the medieval Islamic empires, this logic came to social dominance only with the dawn of the scientific revolution and Enlightenment era in Western Europe. Beginning with the era of colonial expansion and exploitation, and furthered during the era of globalized grade, this logic was exported all around the world. The metric of how "developed" a country is today is largely conceptualized according to this logic, as the degree to which it is "modernized" largely equated to the degree it is able to participate in the global capitalist market. The "secular" and "self-expression" values measured by the World Values Culture Survey (2022) are essentially "modern" values per se, according to the modern cultural logic; the survey shows much of Catholic and Protestant Europe, English-speaking countries (USA, Canada, Great Britain, Australia, and New Zealand), and Japan as reporting high levels of identification with these values. Indeed, modern cultural logic is overwhelmingly dominant across the globe, second in global population only to traditional logic.

Postmodernity

In *postmodern cultural logic*, the emergence of cultural logics per se as an object of consideration, appears first. This logic brings a wider contextual awareness to perspective, as well as a highly critical lens to bear on the presumptions of earlier cultural logics, especially the modern. In particular, the promise of modern Progress is deemed a hollow travesty—an ideological narrative that has created as many existential problems as it claimed to have solved. As a result, any and all such "grand narratives" are eyed suspiciously and with incredulity. There is no "universal truth" as the modern logic maintained; rather, there are only small, local truths. The only functional arbiter between them has been power disguising itself as necessity. The individual recognizes their position within larger systemic forces, one with its own inertia of engrained values and logic. Values converge towards creating space for marginal narratives, voices, and identities historically oppressed by the system's totalizing narratives. Difference, deviation from the norm, and the particular are privileged over sameness, normality, and generality. Relativism and pluralism are fundamental lenses.

Historically, the postmodern cultural logic is quite young, appearing only at the beginning of the 20th century CE and gaining dominance in key cultural domains only after the 1960s. Today, it is the dominant logic in much of academia, the entertainment industry, and, increasingly, corporate marketing.

Such are the principal cultural logics recognized by metamodernism as unfolding over the course of a dialectical sequence. Each emerges necessarily out of the previous when certain aspects of the prior logic meet crucial limitations (owing to increasing complexity) that cannot be overcome within the context of the existing logic. The sensibility first identified by Vermeulen and van den Akker represented the initial movement beyond the constraints of the postmodern cultural logic of the latter 20th century. However, whereas the Dutch cultural theorists saw this movement as being characterized by an oscillation between the modern and postmodern logics, the more comprehensive view of metamodernism recognizes it as a contextually-aware relationship and dialectical synthesis of all the prior logics.

Metamodernity

The *metamodern cultural code,* historically speaking, began to emerge prominently towards the close of the 20th century. Today, it is most pronounced in Scandinavian countries (those moving furthest to the extremes of "secular" and "self-expressive" values), with growing pockets across Europe, Australia, and the United States.

Here, the evolution of all the cultural logics, including metamodernism, is itself reflected upon with the rise of metamodern thinking, which occurs in highly developed and technologically advanced societies with a deepening awareness of the dynamics of complex systems. Breaking with postmodernism's stance of radical relativism, metamodernism sees worldviews as themselves linked to a process of cultural evolution unfolding along an axis of increasing complexification, and hence normatively unfolding according to some higher-order "logic of logics."[4] At the cultural level, this complexification manifests in part as an increasing ability to recognize and integrate more and more contextually-dependent realities within a more holistic framework. The emphasis of the individual thus yields to that of the "dividual," a permeable entity embedded in and imprinted by multiple contexts simultaneously. Values converge towards nuance, subtlety, context-awareness, and the prizing of abilities to effectively organize or create complex interfaces and networks for the good of the whole. The recognition of complexification encompasses not just *cultural* evolution (i.e., worldviews) but also *biological* and *cosmic* evolution as well, out of which culture ultimately emerged. Metamodernism thus suggests not only a specific cultural paradigm, but a grand narrative that contextualizes cultural development within a much larger frame going all the way back to the origins of the universe, breaking through the modernist and postmodernist pitfalls and constraints. To the degree that metamodernism thus attempts to integrate all previous cultural logics, while also articulating the evolution of these logics within a cosmic context, it presents theories of everything (ToEs) that can be brought to bear across a host of domains.

The framing of metamodernism as a cultural evolution mappable to the MHC raises the inevitable question of what follows metamodernism in the dialectical unfolding

---

[4] Here the "meta" of metamodernism takes on a new significance, as the word can also imply a recursiveness or second-order reflection.

of cultural logics to incorporate/integrate expressions of metamodernism into a higher-order framework. This leads us to archmodernity.

Archmodernity

Metamodernism exhibits transdisciplinary, metatheoretical scopes of integration, giving rise to logic of logics, sensibilities of sensibilities, periods of periods and so forth with other context contextualizing frameworks, some of which are theories of everything, that is, interdisciplinary and transdisciplinary unification metatheories that describe explicit architectural, processual, and calculatory frameworks. In the metamodern spaces, the diversity of unification metatheoretical models can be recognized, but they have not been entirely synthesized. Where one begins to treat unification metatheories as units of analysis for comparison and contrast in search of their common traits (arches, arch-relations, and arch-systems), and where one begins to coherently make proposition derived from such inquiry into some kind of higher ordering schema built on such unification metatheory, it is expected that from this trajectory of sociocultural evolution, a new, unique kind of social sensibility will proceed from the metamodern one, which we here term archmodernity.

Archmodernism will no doubt be an era of sociocultural sensibility characterized from archdisciplinarity, archtheory, and archpractice applied within and across social spheres. We know that it will be characterized by the coming together of unification metatheorists and communities of unification metatheoretical views, where context of contextualizations will be synthesized, and identification and ordering of arches, arch-relations, and arch-systems will make way for a higher order of shared coherency, syntheses, and consensus. We can expect that this will be a unification of the unifiers with different approaches to unifying, and consilience among consilience makers with different pluralism methods of consilience. We anticipate that such future thinkers will come together on their shared ideas and interests towards correcting catastrophic deviations and aligning properly with what nature requires, for the healthy evolution of our planet, and our species survival and flourishing as a whole. We anticipate people will realize new and improved ways for making the world better that no one has thought of before, new ways that could only be realized through the thought-forms and ethics that could only have

emerged at this magnitude of integration, complexity, organization, and coordination.

If the transition dynamics found in the model of hierarchical complexity (Commons & Richards, 2002) is any indication of how archmodernity will unfold, we can expect that there will be themes in how it is received. While we are careful about how we use the term "paradigmatic" in this paper, the move from metatheory to archtheory is a similar kind of "paradigm shift" in Kuhn's sense (1962). We expect that many people will reject archmodernism outright for a variety of reasons specific to their circumstance of sense making, or out of preservation's sake to maintain a status quo. There will be early adopters who see archdisciplinarity as complementary and well-fitted for their current sense making. There will be transitional periods for many who, while they cannot entirely integrate it into their sense making, will nonetheless oscillate with a certain kind of relativism, placing it side by side with their already existent sense making and put it to use in cases where it makes sense. There will be scenarios where people move into archdisciplinarity to a lesser or greater degree, where in some cases people will integrate archtheoretical segments into their metatheories, while in others cases people will fully embrace this sociocultural evolutionary step and integrate the integrations, making the move from being metatheorists into archtheorists across metatheories, taking a larger role in advancing into the edge of this largely unexplored frontier of human understanding.

We can describe in short words the only thing that archmodernism could be: a sociocultural stage defined by the actions of unifiers unifying with each other towards shared interests of global flourishing. We've also here described expected scenarios from what we understand from transition dynamics of hierarchical complexity among individuals and groups. However, what the actual content of the who, where, what, why, when, and how for archdisciplinary in whole and part accepted, rejected, oscillated, retroactively applied to existent metatheory, new archtheoretical notions proposed, what archpractice looks like in action, and any and all other evolutions and variations of archdisciplinary expression, is largely unknown.

When discussing new stages of sociocultural evolution beyond metamodernism, things get a bit weird. In *Is metamodernism the last stage of development? Chaos*

theory might hold the answer (Freinacht, 2022), Freinacht points out that the speed is increasing in which meta-memes appear, and draws a parallel in the distance between historical emergence of meta-memes with Feigenbaum's constant of 4.67 (1975). This is to say, the time period it took for a meta-meme to appear divided by 4.67 gives the approximate time period until the next has appeared when looking backwards in time. Freinacht states the archaic period emerged around 250,000 years ago, then the animist period about 50,000 years ago, the faustian 12,000 years ago, post-faustian 2,500 years ago, modernism 600 years ago, postmodernism 125 years ago, and metamodernism 30 years ago. Thus, the eighth meta-meme of sociocultural evolution would be expected to come into existence about now and become socially known and prevalent within 5 years or so – which we here name archmodernism. Freinacht states that if we continue this trajectory (and if we say that archmodernism represents the eighth cultural logic), the following cultural logic would emerge in about 7 years from this publication, the next within a few weeks of that, then days, then hours. Freinacht's pattern points towards a general agreement of timeframe as Kurzweil (2005), that things are heading towards some kind of apex singularity point. Though these sorts of predictions have evidence to support them and are certainly possible, we do not know for certain what will actually happen. Time will tell. Whether or not things play out as these schemas predict, what the cultural logic that would follow from archmodernity will be is as hard to predict as archmodernism cultural logic was when metamodernity emerged.

But the weirdness continues. One may find it very useful to contextualize sociocultural evolution along developmental trajectories of cultural logics and meta-memes. However, as was discussed above in regards to universal computation, the means for cognitive coherency through languages and meta-languages of logic (here related to cultural logics) and semiotics and meta-semiotics (here related to meta-memes), are in the archtheoretical space realized to be expressions of a higher ordering set of archtheoretical properties in which these notions of cultural logic and meta-memes are expressions. Therefore, the next cultural logic may not even be a cultural logic per se, but a higher order property shown to hold for any given meta-language and meta-schema of sense making expressed in cultural logics and meta-memes, such that these higher order

archtheoretical properties are downward assimilated or converted into cultural logic and meta-meme expression secondarily.

Archmodern sociality doesn't replace metamodern sociality or make it obsolete, it synthesizes metamodern socialites in the same way that metamodernism seeks conciliation across modernity and post-modernity. Archmodernism occurs directly from metamodern individuals and groups who create or/and advocate metatheoretical and unificatory metatheoretical work who work together towards finding commonality and work towards shared interests, finding ways to help each other's approaches to be more stable and capable, and combining each other's (unification) metatheories and meta-practices towards archtheory and archpractice, affording more accurate renditions of reality and more successful methods of positive transformations across scales.

Archdisciplinary Research

Foundations of Archdisciplinary Research

Approaching archdisciplinary research

In approaching archdisciplinary research, we seek to establish a strong foundation for which to go forward. Archdisciplinarity builds on transdisciplinary methodological pluralisms and the methodologies they integrate, yet we need to find a path forward that goes beyond previous constraints. For example, it would be a misnomer to say that the foundations of archdisciplinarity are strictly empirical or phenomenological, since the archdisciplinary units of analysis are unification metatheories that account for, describe, and organize ways of knowing such as the empirical and phenomenological methods into methodological pluralisms and metapractices. We suspect that the higher reaches of complexity involved in this endeavor are what Commons calls ultra stage (Commons, forthcoming).

To discuss this space, we need a higher order sense making that integrates all that has come before it, which includes a) metatheoretical interpretations and syntheses of ways of knowing, b) methodological pluralisms and metapractical ways of knowing, and c) archpractice ways of knowing, some of which exist in hypothetical and early archtheoretical forms, but for archtheory in general, what synthesizes and builds on what came before. This means finding what transdisciplinary

methodological pluralisms have found, and what the general consensus is in terms of the scope and limitations of ways of knowing within disciplines, interdisciplines, and transdisciplinary methodological pluralisms themselves. We need to move from integrative pluralism of side-by-side approaches, to archtheoretical synthesis across them on their shared universally agreed consensus. Therefore, we are here finding ourselves as explorers of the frontier of the absolute edge of human understanding, and what we here propose for the foundations of archdisciplinarity is the best description of the 'current state of affairs', where what archdisciplinarity is and does, will no doubt update and improve over time.

We here put forth that archdisciplinary study rests on the following notions: 1) archdisciplinarity is the comparative study that treats transdisciplinary, theory of everything, all-inclusive, unification metatheories as units of analysis in an approach external to them, 2) arches can be found and shown to recur across these kinds of high level models which help us locate what the universal consensus is towards universal laws and absolute truths, and 3) the arches be accounted for, described, and put into order by natural relation into systems as the basis for archtheories. These will be further expanded below.

Criteria for what constitutes a unification metatheory

We define a unification metatheory adequate for comparison as exhibiting one or more of the following criteria: 1) a coherent unifying architectural, ontological, or structural schema, 2) a coherent unifying processual, methodological, or transformational schema, 3) a unifying coherent calculatory, functionative, or recursively formulaic schema, 4) or/and a coherent stratification, plexification, or combination thereof consisting of integrative levels or/and complexity, 5) ordered universals populating any of the above. Metatheories and theories with less than all-inclusive modeling but yet are nonetheless attempts to unify a discipline or domain (such as physics, psychology, sociology, spirituality, biology, economics, etc..), are here considered important, yet secondary and supplemental. For example, a theory of everything that describes a unification of everything in the domain of physics but does not account for, describe, and put into order other domains such as life and mind can still be compared for common characteristics with other

metamodels of the same scope, as well as that of other metamodels that are more expansive and inclusive across domains.

Through the lens of the model of hierarchical complexity, we here make some proposals for two different cases for how a unification metatheory can be hierarchically complex. In the first case, unification metatheories may downwardly assimilate paradigmatic schemas into lower stage coordinations, and the metatheorist performs metasystematic task performance for finding morphisms across those systems of abstractions, morphisms which are then codified into a paradigmatic stage coordination *about* paradigmatic schemas (what Barker calls diagonal complexity). In the second case, unification metatheories exhibit no downward assimilation, and coordinate paradigmatic schemas into a successful cross-paradigmatic performance, arriving at some kind of parallel for which the multiple paradigmatic schemas can be fitted together. Where a unification metatheorist has different cross-paradigmatic coordinations for a single or multiple domains, one may fit those cross-paradigmatically coordinated domains together along higher order properties as a meta-cross-paradigmatic performance. This successful coordination either further unifies the field of a given domain, or unifies across multiple domains.

A clear indicator of the difference between these two cases of coordination are to what degree a unification metatheory performs the subtask of accounting for, describing, putting into order, and coordinating the principled metasystems in which paradigmatic schemas codify. We here consider both kinds of behavioral complexity coordination important for archdisciplinary inquiry, with the main difference in the resolution of detail which a unification metatheory describes. Both approaches can make observations of similar phenomena and make useful contributions. We here see this serving a positive and necessary social evolutionary function, where some unification metatheories will be more digestible than others to the general public. It also gives us an understanding that a higher stage coordinated unification metatheory can be deliberately downward assimilated for public digestibility, while a lower stage coordinated unification metatheory can be scaffolded upward to greater specificity and be improved in the process.

Arches, archtheory, and unification archtheory

An arch is here defined in the archdisciplinary context as a universal, archetypal pattern that can be shown to be in common across two or more unification metatheories. The more examples found, the stronger a case can be made for a given arch's universality. Since unification metatheories literally encompass everything known, we anticipate that there are different classes of arches that can be fitted together into a larger coherent archtheoretical system, and there may be layers of arches, arch-relations, and arch-systems in various degrees, scopes, and scales. This is to say, we anticipate that reality and our cognitions about it have universal properties that can be clarified with enough variations of expression that are overlapped to verify them. We encourage a liberal exploration of arches for what they can be, how they are related, and how they can be systematized.

The base hypotheses being put forth about archtheory then, is as follows: 1) coherent schematized unification metatheories define non-arbitrary parts, relations, and systems of relations, 2) there are recurring arches, relations between arches, or/and systematization of arches that can be observed to hold across unification metatheories, 3) these arches, their natural relations, and systems of relations can be identified, named, and cataloged, such that 4) the investigation into arches, natural arch relations, and systems of relations constitutes an archtheory.

Archtheories are essentially theories that synthesize unifications into a unification across unifications. However, we anticipate one step further – unification archtheories. Consider metatheory and unification metatheory; a metatheory is often an interdisciplinary synthesis, and unification metatheory incorporates all theories or all disciplines in a transdisciplinary manner. Similarly, archtheories synthesize a limited scope of unification metatheories, whereas a unification archtheory will integrate all known unification metatheories. While single or small parties may generate archtheories, the achievement of a unification archtheory will most definitely require a large collaborative effort. This is both a matter of cognitive capacity and time constraints on any single person or small party. We anticipate that in the case where multiple parties attempt to construct a unification archtheory, and each synthesizes the same content to the same level of synthesis, any two unification archtheories will turn out about the same because of the immanent

nature of the archetypal patterns that are arches. It is at this point of a unification archtheory that we suspect epistemic and technological singularity will most likely occur. What kind of disciplinary scope, theoretical type, and sociocultural sensibility that exists beyond this point is hard to guess, since we lack components in which to reflect on it, components which can only exist after the singularity synthesis has been achieved. If the fractal of universal computation were to continue, we can anticipate it will involve coordination of singularities, singularity relations, and systems of singularities.

Classification of Transdisciplinary Works

Classification by history, location, and authorship

There are a variety of ways in which transdisciplinary unification metatheoretical works can be classified, such as by historical and location of appearance, the conventional categories of academic disciplines and lineages in which they were devised, or/and along arches. Here, we will give a brief description of each.

We anticipate that some archdisciplinary scholars may choose to focus on comparisons of models strictly within the context of a given historical period, different areas of the world in which they appeared, or specific academic disciplines in which they've grown from. Other archdisciplinary scholars may choose to focus on cross-historical, cross-location, and cross-lineage comparisons. We advocate for all of these. An exhaustive but incomplete account of unification metatheories and relevant literature by author is appended as a table at the end of this booklet.

Classification by conventional categories of knowledge and academically derived fields

There are conventional categorizations and academic disciplinary derivations. By conventional categorizations of knowledge, we mean conventions such as religion, mythology, esotericism, arts, philosophy, and science (e.g. see Storm, 2021). By academic disciplinary derivations, we mean divisions by natural science, social science, formal science, and applied sciences (Wikimedia Foundation, 2022).

Metatheories and unification metatheories have often grown out of specific fields of inquiry while retaining some or all dispositions associated with the grounds in which it grew. Here, we suggest viewing diversity of backgrounds and dispositions as a strength for comparative studies, keeping in mind historical to contemporary circumstances in which a unification metatheory was generated, and the purpose for which the metatheory was designed. We also admit the usefulness of using existing unification metatheoretical models as a basis for interpreting other unification metatheories, so long as researchers keep in mind the bias associated with doing so. A unification metatheoretical interpretation of another unification metatheory does not equal an archtheory, though it certainly can be a step towards it.

Classification by arch presence and expression

There is also classifying unification metatheories by the arches, arch-relations, and arch-systems in which they exhibit, found by comparative analysis among them. The examples we provide here are through calculative orientation, integrative levels, complexity, and universal grammar.

By calculative orientation, we mean assessing where emphasis is placed in terms of architecture, process, or/and the calculative synthesis of both simultaneously. In more common language terms, this translates into assessing where emphasis is placed in regards to a unification metatheory having to do with ontology, methodology, as well as if and how they are at all coordinated in the overall epistemology of the unification metatheory. As a corollary, we can also divide unification metatheories by what extent that the unification metatheory is applied in general metapractice, and their functional usefulness and outcomes, and we can do so without making truth value judgements about them. For calculatory types, this means finding persisting staticisms, entities, equilibriums, architectures, and compositions that hold across unification metatheories. For calculatory operations, this means finding persisting dynamics, actions, relations, processes, and transformations that hold across them. For calculatory functions, this means finding persisting equilibrations, eventities, systems, calculations, mappings, entity-in-action orientations and coordinative constellations that hold across unification metatheories.

By integrative levels, we mean to describe where a supervene is the result of the coordination or collectivity from a lower subvene. Unification metatheories often have some kind of stratification system in which to order the natural relations of building blocks into greater scopes and scales of complexity. By complexity, we can therefore compare horizontal, vertical, and diagonally complex renditions of reality, comparing hierarchies and holoarchies (vertical), rhizomes (horizontal), as well as heterarchies and panarchies (diagonal). We can also compare in terms what level or order of complexity in which a given unification metatheory was constructed via domain-general process theories such as the model of hierarchical complexity (Commons, 2008) and dynamic skill theory (Fischer, 1980), domain-general architecture theories such as in Wilber's levels (2000a; 2007) and Henriques joint points (2011a; 2011b), as well as with universal calculatory expressions such as in Barker's universal computational simulacra (2019c) as an attempt to describe complexity by it's essential characteristics.

Another way is via the universal grammar characteristics in which a given unification metatheory is oriented. In Esbjörn-Hargens (2016) he describes interrogative words and other functional word types such as articles, pro-sentences and conjunctions, alluding to universal cognitive function properties which are employed in the fundamental operational and communicatory basis of sensemaking. As Alderman & Pascal describe (*Also/Perhaps*, forthcoming) prepositions and adverbial structures display qualitatively distinct modes of the included middle such that we can plausibly generate colloquial, logical and philosophical styles of interaction and prepositional framing that exemplify the underlying metaphysical assumptions and parallax both within and between unification metatheories. These approaches are highly compatible with intelligibility tools such as the 6w. For example, asking "what" is asking about architecture and ontology, asking "how" is asking about process and method, and "why" is asking about calculation and function. "When", "where", and "who" allude to time, space, and mind/psyche, which themselves are recurring universal classes that recur throughout unification metamodels – which are likely arches in of themselves. Landry also gives a metaphysical assessment of what is ontologically implied in the 6w framework (Landry, 2009/2002). For some, universal grammar properties can be perhaps one of the most relatable and approachable means to archdisciplinary inquiry.

We believe each approach above mentioned is useful. Using conventional classifications and academic disciplinary derivations are useful because they immediately connects archdisciplinary inquiry into classical sensemaking which is digestible to typical audiences, although in some cases the classifications may ultimately be quasi-arbitrary. Unification metatheoretical classifications are useful because they build bridges of sensemaking for the established audience of a given unification metatheory into understanding others. Archtheoretical classifications are useful because there is already a starting point demonstration that arches are holding across unification metatheories, and that they represent a demonstration of the kind of universality that archdisciplinary seeks to uncover and systematize.

Archdisciplinary Study and Practice

Archdisciplinary study and practice

For archdisciplinary study, we've identified three areas: 1) comparative and critical research, 2) archtheoretical proposals, and 3) community co-creative archtheorizing. The first area, comparative research, is the comparison of unification metatheories and organization of them along some classification criteria, else in search of arches that hold across their meta. The second area, archtheoretical proposals, is where individuals and groups make proposals for how to synthesize the discovered segmented arches, arch relations, or arch-systematizations into a formalized archtheory. The third area is community co-creative archtheorizing, where proposals for how to synthesize the archmodels will be synthesized through community collaboration towards a shared unification archtheory.

In the definition of archdisciplinarity, we've frequented the description of taking big picture, transdisciplinary, theory of everything, unification metatheories as units of analysis. By units of analysis, we mean treating them as artifacts of human expression. Comparative analysis means stepping outside whatever bias we might have for or against one unification metatheory or another, and trying to look at them from a neutral observer standpoint as much as possible. It means recognizing that each unification metatheory is going to have strengths and weaknesses, and that it is perfectly possible to look for commonalities and differences without making

value judgements on what is being observed. As has been described above, arches take a wide diversity of expressions, and therefore it is not just possible – but expected – that certain contents of the expression of arches are going to have varying degrees of fittedness to facts while the arches persist. For example, universal computation can calculate any given content regardless of whether or not what is being calculated reflects some real world case. Another example is with integrative levels – different unification metatheorists depict building blocks of reality in different ways, but we're more interested in the fact that integrative levels are a repeating intrinsic motif at all. As for critical analysis, we'll get to it a bit further below on *collaborative ethics*.

This isn't to say that having a preference or an opinion is a crime. On the contrary, preferring or leaning into one unification metatheory or another is beneficial to get a perspective about other unification metatheories through a given unification metatheoretical lens. We need these approaches to get the full plexus of all permutations of perspectives. Yet, archdisciplinarity by definition, ultimately means treating the models as units of analysis, stepping outside them, zooming outward and looking at the field as a whole, getting some bearings from the proverbial angel's view of all the bird's eye views. Any one of us could have been born in the circumstances of anyone else, and been led to create or follow any other unification metatheory than one we favor. Archdisciplinary study means being able to fully dive into and immerse oneself in a unification metatheory, and be able to let go of it to dive into another, with the intuition that there are truths to be found pervading across them all. This means trying out different ways to unify everything we know about everything, and looking for universal patterns across them.

As part of the archdisciplinary archpractice research, we've identified three areas: 1) applied archtheoretical research, 2) real world application, and 3) reporting application results. Here, the first area of applied archtheoretical research includes two or more unification metatheories being used together via some classifier or previously identified arches, arch relations, or arch systems, towards understanding and explaining real world problems towards discovery of new solutions through the combined strengths of the unification metatheories being employed. The second area concerns real world application, where the proposed solutions informed by an archtheory is applied to solve these real world problems. The third area is collection

and report of the results of a given project, written and published as a journal article or in book form, or presented in other mediums depending on the project needs.

In archdisciplinary practice, integrative pluralism (or integrated pluralism) is a useful term describing using multiple frameworks at different scopes of academic practice. The historical use of integrative pluralism designates *joint usage* of a multiplicity of ontologies and methodologies which are taken side by side to understand and solve a problem. The historical use of integrated (integrative) pluralism goes as far back as Mitchell, where she describes integrative pluralism as 1) mechanical rules that can be used to quantitatively determine the joint effects of independent additive causal processes explained by different theories, 2) local theoretical unification where features of a complex process are jointly modeled, and 3) explanatory, concrete integration where partially independent factors participate in structuring processes where factors span time and dimension scales, as well as standard scientific disciplines, where even finding modest unification theories could be elusive (see Mitchell, 2002; 2004).

Plurality does not necessarily imply non-unity. Joint usage means not giving one framework a superior position over other same-scope frameworks, but recognizing that each framework offers different perspectives and solutions on a given problem. This can happen in two ways: arbitrarily or non-arbitrarily. In arbitrary joint usage frameworks, this means there is no higher level organizing framework yet found in which the frameworks being used jointly can be unified – yet joint usage is nonetheless useful in a given problem solving task (which Mitchell describes in #1 and #3). In non-arbitrary joint frameworks, this means using a highest achieved unification across the joint use of next-lower ranking frameworks such as a metatheory jointly using theories, a unification metatheory jointly using metatheories, or an archtheory jointly using unification metatheories (what Mitchel describes as #2). Arbitrary integrated pluralism is not by nature a bad thing – it signifies cooperation even where an agreeable or satisfiable higher order unifying framework is yet to be found. Nonetheless, a higher order non-arbitrary framework that has found unity across next-lower ranking frameworks (whatever scope of theory we are talking about), will enjoy a much more robust and streamlined application. All this to say, arbitrary integrated pluralism is a transitional step before a non-arbitrary integrated pluralism (a unity) which is very likely waiting to be found.

We can carry forward the notion of integrated (or integrative) pluralism further as we move from metatheory to unification metatheory to archtheory, and make clear categorical distinctions of which scope that an integrative pluralism may be describing by appending the adjectives to the integrative pluralism. For *metatheoretical* integrative pluralism (the theoretical scope which is depicted in Mitchell), one acts with an interdisciplinary scope using a limited set of theory. For *unification metatheoretical* integrative pluralism (such as Integral Life's Institute of Applied Metatheory, and Henriques unified psychology and unified theory of knowledge) one acts at a transdisciplinary scope, drawing from the broadest set of theories and metatheories (though both given examples are surely going to upgrade). For *archtheoretical integrative pluralism* (such as Esbjörn-Hargens' complex integral realism and Hedlund's visionary realism), one takes a limited set of unification metatheories and uses them jointly. For *unification archtheoretical* integrative pluralism, one draws from the broadest set of unification metatheories (which we anticipate will happen further down the road).

Collaborative ethics

Hedlund and Esbjörn-Hargens (2022), through the experience of social collaborative searching for common ground among critical realists, complexity metatheorists, and integral metatheorists towards complex integral realism, had made several suggestions for best practices across several topics for working in this space: 1) dialogue and dialectical engagement where participants engage in genuine open dialogue towards creation of mutual understanding and learning, 2) learning to speak each other's metatheoretical languages with the understanding that different scholars and their proponents will have different signifiers, different referents, and nuances that are referentially divergent, 3) hermeneutic and ontological generosity where participants show good faith towards each other's approach, 4) when working together on real projects in mixed teams, identifying practical areas that different metatheoretical vantage points converge on towards collective sense making about metacrises, innovating new physical and social technologies, strategic interventions in systems and applied socio-political initiatives, 5) epistemic reflexivity at individual and team levels in that both individuals and teams exhibit the ability to recognize their own respective biases, preferences, and lived experiences as objects

of reflection, and 6) the cultivation of philia which entails genuine friendship among metatheorists built on care, trust, mutual support, solidarity and resonance in shared values and purpose.

We recognize that there is a wide diversity of unification metatheorists who come from different backgrounds, asking different questions and constructing different unification metatheories from different motivations, who often do not agree with each other's work. A code of ethics specific to the nature of ARC was proposed and drafted by Görtz and Ranefors, which was discussed and modified among other founding ARC members, and after consensus, determined to be our code. This code was agreed to be a starting point, which could be updated, further negotiated, and improved over time as ARC members encountered unforeseen situations that could not be predicted. Thus, the code of ethics below, describes our current best-ideas for what manner of ethics are required for the purpose of ARC as an organization, and archdisciplinary endeavors in general. Each item of the ethical code is non-arbitrary, and reasons for them will be given and explored.

First, is the ethic of mutual benefit. It is unrealistic that any unification metatheorist (or archtheorist) on their own can independently reach a sufficient degree of impact to foster the kind of evolution our species requires. Different unification metatheories appeal to different kinds of audiences who have different kinds of interests. Unification metatheories exist to demonstrate an apparent trajectory of increasing scopes and depths of synthesis within and across domains. We take the position that such differentiation and integration processes among unification metatheories as described by Hedlund and Esbjörn-Hargens (2022) and with knowledge generation in general as described by Cook-Greuter (2013) is advantageous for the evolution of human understanding and truth-seeking. As described by Commons (2008) and Ross (2008), differences are part of the very operations required for transition from one magnitude of behavioral complexity to another. When these unification metatheories are taken together as a whole, they have a far enough spread of varying appeal such that they are able to scaffold people from different demographics along this trajectory of increasingly complex understanding and ethical ways of behaving. Insofar as unifications metatheorists share in common the motivation to see our species be successful, we are all on the same side.

Many past and present unification metatheorists may have believed they have achieved the greatest synthesis our species has ever achieved, yet their work does not include and coordinate other unification metatheories of the same magnitude of complexity in the way that archdisciplinarity has described. It follows that an even greater magnitude of complexity exists in which the diversity can be reconciled, namely archtheories. This can be a very jarring reality to contend with. The emergence of archdisciplinarity can be a destabilizing event for unification metatheorists. Unification metatheorists who have constructed models of this magnitude have often devoted their entire lives to the endeavor of doing the seemingly impossible task of putting into order the entirety of all human understanding about ourselves, our world, and the universe. Many have given their all with blood, sweat, and tears, and faced adversity in the face of a world full of people who would not or could not understand the necessity and importance of their work in the bigger picture. For many unification metatheorists, their work has been their legacy. Many had perhaps believed that their life's work was the ultimate apex of human understanding. Yet it clearly was not.

ARC takes the position that unification metatheoretical endeavors are not just evolutionarily expected, but functionally useful, despite whatever errors or/and limitations they have, and to whatever degree they have them. They provide the required building blocks that the continuation along this trajectory of knowledge synthesis that evolution of understanding requires, in the same way that disciplinarity was a requirement for interdisciplinarity, and interdisciplinarity was a requirement for transdisciplinarity. Higher orders of coordination at an archdisciplinary scale requires the stable states of equilibrium of the transdisciplinary works in which archdisciplinary work is defined to coordinate as a natural condition of increasing complexity (see Commons, 2014d). Therefore, we want to see existent unification metatheories be stable schemas, such that we can build on them.

There is a certain kind of verification about unification metatheoretical depictions of reality that can only be found through identification of arches, arch-relations, and arch-systems that already exist within them, whereas these patterns cannot be found through any other means other than comparative inquiry across unification

metatheories. The challenge in getting verification that high level properties in unification metatheories are reflective of reality itself, is because in many cases, conventional methodologies that are traditionally employed to demonstrate validity of a theory or practice are often accounted for, described, and organized in unification metatheories themselves, such that unification metatheories often embody a unique form of methodological pluralism or some new kind of metapractice altogether. So while conventional methodologies can be used to give different kinds of verification to certain scopes of unification metatheories, conventional methodologies cannot on their own adequately verify certain high level properties that unification metatheories exhibit, not without downward assimilating the unification metatheory into the limitations of a conventional methodology – limitations that a unification metatheory in question deliberately was designed with methodological pluralism or a new metapractice to overcome. And furthermore for these cases, the unification metatheory and its methodological pluralism or unification metapractice cannot be used to verify properties of itself without coming off as though a unification metatheorist is saying "my metatheory is correct because it says so," even if it were to be true. There is a need for an external reference, namely that of the findings of other unification metatheories, verifications discovered through one rank higher comparative inquiry, what we here have termed archdisciplinarity.

So if one wants to get high level proofs for a given unification metatheory, this is going to require a new kind of complexity and understanding that we are only now discovering through comparative correspondences between unification metatheories in search of arches. Where an arch, arch-relation, or arch-system has already been discovered and found evident in another unification metatheory, the demonstration for how a particular unification metatheory expresses such, can also in reverse help approximate the existent arch definitions through synthesizing the newly found expressions with that expressed by others. For this reason and those mentioned above, mutual benefit is an ethic we promote.

The second ethic is mutual respect. In order to successfully construct an archtheory or unification archtheory as a community, it requires significant restraint on the part of scholar participants so as to not devolve the comparative studies into intellectual violence. If history is any indication of human perfection, we should expect that all

unification metatheories will have errors, and be missing things. And if history is any indication of human nature, we should expect that scholars are going to disagree about things, sometimes strongly so. It is entirely expected that some unification metatheorists will view their own unification metatheories as superior to that of others, to a lesser or greater degree, while others will take a more neutral approach. We strongly recommend reserving critical analysis of unification metatheories during both comparative research and in the prose of reporting results of comparisons in literary writing. We believe that comparative study and literary reports of such findings will best serve the public good by presenting the unification metatheories in the way their authors describe them, and giving archtheoretical propositions about their commonalities without discriminatory critique of the metatheories themselves. This is to say, the comparison can be done without subscribing to and defending, or critiquing and offending the metatheories being compared for commonalities and differences. Scholars who have authored unification metatheories may have a bias towards the legitimacy of their metatheory and illegitimacy of others, yet we believe that it is both possible and necessary to set aside biases during comparative research.

Critical analysis is important and necessary towards any proposition of truth. The motivation for why we place more emphasis on looking for commonalities and less emphasis on critique in the earlier phases of archdisciplinary is not because we have a desire to insulate unification metatheories from fair evaluation. This is not about suppressing shadows, ignoring valid arguments, or trying to make negation a crime. Rather, it is because comparative studies by their very nature do not involve critical analysis. Critical analysis of unification metatheories is a different kind of endeavor. It is not helpful to comparative studies in search of common ground, where people are constantly put on the defensive by being accosted by others, both within the archdisciplinary projects of ARC, as well as in the general academic and public forums. There needs to be a high level of ethical scholarly maturity that does not fall into either groupthink or an anything-goes ethos. Where unification metatheorists can respect differences and trust each other in the shared comparative research on neutral grounds, we anticipate that this will create an ethos of mutual respect, leading to situations where parties that want to discuss differences can feel safe in agreeing to consenting boundaries for discussing differences in good faith. In terms of present ARC members, most of us are open to discussing errors in our work with

each other, yet only because we have established trust in each other that the motivation for discussing errors isn't to invalidate each other's work, but rather that the motivation is to help each other's work become more stable, and if anyone doesn't want to engage in such a discussion, there are no negative consequences in social standings for making that choice. But again, critical analysis is a separate endeavor from comparative studies, and the two need to be clearly distinguished in social dialectics and literary works. The purpose of the archdisciplinarity project is to foster a spirit and practice of close collaboration between unification metatheorists who have created an original theory or have expertise in one, not to compete over whose model is better.

Archdisciplinary Methodologies

Hedlund & Esbjörn-Hargens

To date there are no well-established or recognized methods available for the analysis, comparison, or synthesis of unification metatheories into higher-order archtheories that engage the contexts of evaluation and integration for multiple metatheories. (Edwards, 2010; Esbjörn-Hargens, 2016; Marshall, 2012). In some cases, however, established methods developed for the analysis of multiple disciplinary or mid-range theories can be deployed to analyze multiple integrative/unification metatheories; see, for example, Mark G. Edwards (2008, 2010, 2013) scientific method for identifying the 'lenses" embedded in such theories and linking them in an metatheory. Edwards refers to the 'clearing' of integral meta-studies in which a variety of metatheoretical research projects can be pursued and has developed a scheme for an integral metastudies or metascience - including meta-methodology, meta-data analysis, meta-hermeneutics, and meta-validity - that is relevant for archdisciplinary research.

Edwards (2010) also highlights that one of the reasons why the field of metatheory has not become more established in the academy is that it has tended to lack an explicit and transparent methodology or epistemic reflexivity – and the intersubjective validation discourse it enables – and has instead relied on the methodologically opaque approach of 'traditional scholarship' which sidesteps the demands for procedural rationality (Habermas, 1996). While there are some relevant

resources for developing formal, transparent methodologies on the archdisciplinary level, this is, nevertheless, largely uncharted territory. There are, however, some examples of emerging methodologies for the comparative exploration of multiple unification metatheories that we can draw from to learn more about how we might approach such a meta-evaluative process. For example, as discussed above, Esbjörn-Hargens and Hedlund were instrumental in convening a 5+ year series of symposia that brought together unification metatheorists across multiple streams, including critical realism (Bhaskar), integral theory (Wilber), and complex thought (Morin), to engage in generative dialogue with the aim to contribute to the collective advancement of multiple unification metatheories, also known as integrative metatheory or integrative metatheory 2.0, as well as the development of various higher-order syntheses or archtheories (Hedlund et al, 2016; Hedlund & Esbjörn-Hargens, 2022; Hedlund, 2021). Insights into how to understand correspondences between unification metatheories, including the identification of commonalities and differences, were developed in this rare meeting and in-depth comparative analysis across multiple big-picture, metatheoretical approaches.

By looking at examples associated with the critical realism and integral theory (CRIT) symposium series and the three resulting books (Bhaskar et al, 2016; Hedlund & Esbjörn-Hargens, 2022; Hedund & Esbjörn-Hargens, 2023) we can begin to outline the contours of what a more formal archdisciplinary method might consist of. The CRIT symposium formally ran from 2011 - 2015 and continued informally thereafter for a few years. This symposium brought together 15-20 leading scholar-practitioners representing each integrative metatheory, as well as a few metatheorists not identified with either school to play or more mediating or triangulating role. The process they went through over several years of collaborative engagement can serve as the template or inspiration in the development of a formal archdisciplinary methodology. These included four main phases:

1. *Meta Mapping:* Identify and map out similarities, differences, compatibility between the two approaches.
2. *Meta Hermeneutics:* Learning each other's theoretical languages, clarifying when terms sound similar (semiotic overlap) but are different (referential

divergence) and when they sound different (semiotic divergence) but are similar (referential overlap).

3. *Perspective Coordination:* Debating with epistemological and ontological generosity – giving the benefit of doubt to each other as we developed a more sophisticated understanding of the similarities and differences between each approach.

4. *Application:* Applying both approaches in various combinations to real world issues in teams with individuals representing each approach.

Each of these phases could have additional steps or sequences of analysis. Also, while there was a general sequence of these four phases in order, there were times in the process when the activities of one phase occurred alongside or before the other. In its simplest form these phases express the process of taking perspectives, seeking perspectives, coordinating perspectives, and embodying perspectives.

Through the symposium series, we saw two general approaches to the synthesis of multiple metatheories (i.e., Bhaskar's critical realism, Wilber's integral theory, Morin's complex thought): 1) *preservative synthesis*; and 2) *non-preservative synthesis.* Preservative synthesis pursues a more clean, symmetrical, and adaptive mode of synthesis (à la Hegel) in which each metatheory and its components are taken up as they are given and then fit together. Based on the interpretation that each metatheory has complementary absences that the others can fill, it is as if each metatheory forms an intact piece of a jigsaw puzzle, and if we put the pieces (presumed to be commensurable or 'true but partial', to borrow Wilber's phrase) together we can have a great jigsaw puzzle - a grand synthesis. In a preservative synthesis, the basic philosophical architectonics of each metatheory and its prehistory are incorporated without negative transfiguration (i.e., preservatively). Such an approach may be appropriate presuming that the pieces being synthesized are indeed evidentially valid, free of internal contradictions, category errors, etc. However, preservative synthesis arguably runs the risk of succumbing to the fallacy of ontological monovalence (i.e., that reality is purely positive) and thereby glossing over real contradictions and absences, and falsely espousing inter-paradigmatic commensurability where little or none in fact exists.

Both Esbjörn-Hargens (2016) and Marshall (2016a; 2016b) forged far-reaching largely preservative syntheses of critical realism and integral theory (as well as complex thought) that they referred to as 'complex integral realism'. Sean Esbjörn-Hargens (2016) performed his analysis and integration of complex thought, integral theory, and critical realism, presenting a 10-point criteria for why each of these three unification metatheories are in a class of their own and worthy of a more systematic analysis and integration. He then identified unique complementary strengths each approach has and created a framework for weaving these three metatheories into a larger meta-metatheory, or archtheory, that benefits from these unique strengths, which also serves to counterbalance to each of their blindspots. Thus, by combining all three into a "meta-meta" archdisciplinary approach he is attempting to unleash the accumulated analytical power of each one while addressing each one's fallibility through the strengths of the others. Esbjörn-Hargens refers to this three-part complementarity as metatrialectics. In an appendix to his chapter he provides a table with 22 categories, each of which illustrates the trialectic harmonies between these three metatheories. Paul Marshall's (2016a; 2016b) work is also noteworthy in its unique contributions to developing a complex integral realism through an in-depth analysis of the strengths and weaknesses of each integrative metatheory on the way to a largely preservative synthesis.

In contrast, non-preservative synthesis pursues a more selective, asymmetrical, subtractive, transformative, and dialectically negative approach in which elements of each metatheory are identified, analyzed for category errors, contradictions (or aporias), absences (or lacunae), critiqued accordingly, and negatively transfigured or remedied to achieve inter-paradigmatic commensurability prior to their integration into a coherent new archtheoretical framework. It is important to underscore that this method eschews and remedies absences and contradictions in each theory's pre-existing form ('absenting the absences') before integrating them (Bhaskar, 1993/2008). Non-preservative synthesis or sublation is a more dialectically negative and ontologically bivalent approach (Bhaskar, 1993/2008; Norrie, 2010), that honors the aporias, lacunae, and overall elements of architectonic incommensurability revealed through the encounter. Such an approach thereby underscores the importance of transformative negation, and typically involves more painstaking and detailed analysis, including architectonic stress testing, in order to

arrive at a synthesis. Such a methodological orientation enables a revisioning of (aspects of) each metatheory's flawed architectonics, extracting negatively transfigured elements of each metatheory and weaving them together into an emergent and coherent conceptual field. Hedlund (2016; 2021) and Stein (2022) both pursued non-preservative syntheses of critical realism and integral theory. Hedlund forged a more global synthesis of the architectonic foundations of each unification metatheory, originally called critical realist integral theory (CRIT), which was later developed into a more robust approach known as visionary realism. By contrast, Stein's rigorous synthesis was more pointed and focused on the interface between dialectical critical realism (particularly its synchronic emergent powers materialism) and integral theory's developmental-structural meta-model of psychology, articulating a 'diachronic emergent powers developmentalism' and a critique of what he calls the 'cognitive maturity fallacy'. Stein's work provides an excellent example of a highly nuanced non-preservative synthesis.

Other methods that emerged in the meeting and comparative analysis of critical realism and integral theory included transcendent and immanent methods of critique. Transcendent critique (not to be conflated with *transcendental* critique) applies external or 'transcendent' criteria to evaluate, in this case, a unification metatheory (e.g., analyzing critical realism using integral theory's criteria, based on integral theories paradigmatic presuppositions). This method of critique can be useful, especially when it is deployed reciprocally by looking at one metatheory through the lens and logics of the other theory and then switching. However, it also runs the risk of situating its critique vis-à-vis either an arbitrary or abstract universal (i.e., Nagel's (1986) 'view from nowhere') point of reference, both of which are vulnerable to counter-critique.

In contrast, immanent critique is a philosophical method associated with Hegel, Marx, and the Frankfurt school of critical social theory that employs the logic immanent within a given theoretical or sociological system with the aim of revealing a system's own *internal* contradictions through the method of transcendental argument pioneered by Kant (1791/1998). This method is a primary method for critical realism, and Bhaskar's work has rich resources for understanding its powers and potentials. Immanent critique works from within the given presuppositions, premises, and conclusions of a system and follows its own systemic logics to identify

intractable internal contradictions (aporias) or theory-practice incoherencies while pinpointing their causes (Hartwig, 2007, p. 107).

Valid immanent critique demands, first, a sensibility of 'steel manning'; that is, a principle of generosity or charity that seeks first to adequately understand—and cast in its strongest light—a position, *before* critiquing it. Such an immanent critique could be said to have hermeneutic adequacy or validity, as opposed to inadequate 'straw man' modes of argumentation based on weak or false characterizations of a position. Immanent critique is an arguably superior method of critique relative to transcendent critique—that is, critiquing a system using external criteria, logics, concepts, or presuppositions—because the revelation of internal contradiction often carries more gravitas, since it does not require a subscription to any external criteria or presuppositions. As Hartwig (2007) writes, immanent critique crucially avoids:

> the 'bad circularity' or arbitrariness implicit in external criteria of knowledge (e.g., judging Socrates by Rorty's criteria) by taking its departure from within the accounts it seeks to situate, correct, or replace—abandoning all pretence of an ahistorical Archimedean starting point and deploying a process of transcendental argument to demonstrate either that an account is theory-practice inconsistent or, if consistent, beset with aporiai or problems that are insoluble in its own terms (p. 106).

Thus, in the context of developing an archdisciplinary methodology, the method of mutual immanent critique of multiple unification metatheories may be a compelling approach. That is, to turn each metatheory on itself, recursively applying each of their respective internal logics and criteria to the analysis of their own intra-paradigmatic coherence. Deploying a reciprocal transcendent method of critique - refracting each metatheory in the light of the other one with an eye for key problem fields and absences - may also be useful. The explanation of the theoretical causes of these problem fields, contradictions, or absences can be complemented by the sociological explanation for their existence or persistence. When the methodology of immanent critique, in the form of analyzing theory-practice contradictions, additionally identifies the cause of such contradictions in the absence of some transcendentally necessary category or

concept, this is known in critical realism as a metacritique[1] (Bhaskar, 1994/2009). These methods allowed archtheorists to identify systematic category errors or areas in need of theoretical revisioning in each metatheory on the way to forging a provisional non-preservative synthesis that might offer a superior epistemic framework Both Hedlund (2016) and Stein (2022) deployed methods of immanent critique to develop their archtheories. Hedlund (2021) went on to develop his visionary realism approach into a much more in-depth synthesis in his PhD research (at University College London), which he calls visionary realism.

For more details on insights gleaned from the symposium series see the introductions to both books *Metatheory for the 21st Century: Critical Realism and Integral Theory in Dialogue* (2016) and *Big Picture Perspectives on Planetary Flourishing: Metatheory for the Anthropocene, Vol I* (2022).

In the above paragraphs we have provided some examples of how comparative analysis, evaluation, and synthesis has occurred between two or more integrative or unification metatheories. One of the important next steps in developing the field of archdisciplinary research as a compelling academic approach is to build more formal methods and processes for working across multiple unification metatheories.

Ranefors

The scientific method consists of making observations, forming a hypothesis, testing that hypothesis, and if there is sufficient evidence, raising the hypothesis to a theory. Theorizing is ongoing, iterating towards better versions of reality. Ranefors defines four theoretical scopes as 1) applying theory 2) applying metatheory 3) applying unification metatheory and 4) applying archtheory. Ranefors advocates that we must carry science forward by applying the theoretical scopes as four operations, to science and all types of knowledge.

In a way, the entire history of human civilization is a story of people creating increasingly better versions of reality. People create ontologies consisting of levels of categories to explain phenomena about what exists, and people do so through epistemologies or methods of knowing – that is, the way they form versions about

what exists. Over time, we've graduated from proto-theories to theories, then metatheories and unification metatheories, and now archtheories. Despite us now arriving at the archtheoretical scope, theories, metatheories, and unification metatheories don't go away. We rely on them as building blocks to increasingly build more complex and integrated models of the world. Additionally, each scope of theorizing inherits the errors from that which proceeds them, and each scope of disciplinarity and theorizing can be blinded to its errors. Furthermore, since each higher rank scope is built on the ranks lower to itself, it becomes a necessary part of the archdisciplinary project to help improve those lower ranks of scope from which it is built.

Theories often borrow from other theories and theories of a discipline are in of themselves centralized on a specific domain. Metatheory often crosses more evenly between domains interdisciplinarily. Unification metatheory encapsulates all domains transdisciplinarily. The ontological frameworks and epistemological/methodological ways of knowing that populate each respectively, exhibit boundaries that create interiority and exteriority. On the one hand, each greater scope of theory builds on the previous scope of theory, while on the other hand, each increasing scope of theory helps better organize and understand what it builds on. Now that we've several building blocks of scopes of disciplinarity and theory to learn from, we can make some new advancements and derive some greater clarity about how all this works.

Ranefors emphasizes the downward application of archdisciplinary research towards upgrading ontologies, methodologies, and overall epistemologies of theoretical scopes at all the previous scales of disciplinary scopes. Since archdisciplinarity studies arches that hold across ontologies, methodologies and overall epistemologies of any and all theoretical scopes, Ranefors anticipates that 1) the interior of existent disciplinary and theoretical scopes can benefit from arches being used to help improve their quality in an orderly way, and 2) exteriorly, no matter the theoretical scope, the arches can be used to better understand how two versions of reality are same, similar, and different, improve the means in which theories at various scopes can be verified with facts to find which has better fittedness to phenomena, and better help consilience occur between them where multiple versions of reality are found to have congruence with the phenomena they

represent, helping them converge towards the next-higher disciplinary and theoretical scope.

Ranefors anticipates that this kind of inquiry will lead to providing researchers and practitioners at all scopes of disciplinary and theoretical inquiry with better means for making better observations of phenomena, categorical definitions of what is observed, better tests on validating hypotheses and theories, for coordinating the ontological, methodological and overall epistemological theory, practices within scope interiors and across them, helping converge them in their exterior local space, and help upgrading the overall archdisciplinary global space.

The upgrading of disciplines will here be described in terms of how we can continue laying down the general pattern of upgrading disciplines through the previously defined four theoretical scopes. Then we discuss where this leads us.

Historically, before disciplines were upgraded with theory, the state of disciplines was one of direct knowledge from an experience and application. We could upgrade a discipline with theory – the first theoretical scope operation – alongside what knowledge was latent and ready to be expanded. The knowledge in a discipline was expanded through clear differentiation of knowledge categories tied to coordination with knowledge acquisition methods, namely here, the scientific method. Upgrading with theory is to a) to develop a hypothesis, b) do experiments, c) get feedback on a hypothesis from reality using the same application as with the last hypothesis, and d) derive the relationship and coordinate between new and existing hypotheses, selecting or keeping as theory the hypothesis that best fits with reality. Finally, the reality we test against with the chosen application is always situated in a larger reality. Moreover, Bhaskar (1976) makes the distinction that we test against a closed system - when in fact, what we seek to know is an open system. As mentioned in the metatheory section, introducing empirical theory to less empirically sophisticated schools of thought, upgraded these disciplines from pre-science status to scientific status. For example, the alchemy discipline was upgraded to the chemistry discipline through the continuous production and application of empirical theories[5]. This

---

[5] In the book From Alchemy to Chemistry (1884, Read, p. 15), we quote: "Like modern science, alchemy had its guiding principles and ideas, although in detail these were subject to modification and varying interpretations, often at the whim of the individual exponent." We could hence define that a discipline is created out of belief in the result of hypotheses tied to an application. Moreover, a discipline

process was accelerated during the age of enlightenment when the scientific method arose as a standardization of how to produce theories.

To upgrade a discipline with metatheory – the second theoretical scope of operation – we will begin with an example of how metatheory can be applied to the discipline of physics to upgrade the discipline. The upgrading process of a discipline includes expanding on what constitutes new knowledge categories and methods for extracting. For example, in physics, we have the well-known challenge of solving for the particle and wave duality. Here, we will try out the metatheoretical hypothesis that particles can be considered singular entities, and waves can be considered a plurality of multiple entities expressing a wave. The ontological distinction of singular and plural overlayed on the particle and wave theory is a metatheory hypothesis of a relationship between the two theories. A metatheory hypothesis that would attempt to solve this disparity could be scientifically tested with the following method: 1) scientifically and systematically, with the ontology of singular and pluralistic describing each theory by themself, 2) proving that "the sum is larger than its parts", that is, to show that while only one theory can at the same time give the most precise picture of specific parts of the terrain, the other is better for other parts. Nonetheless, when we combine them in a relationship, we can get to a broader understanding. Finally, 3) produce a metatheory on the coordination and parts and draw further testable conclusions and guidelines.

An example of how this is already done can be found in Bhaskar's deep stratification metatheory of ontology, where he showed that for science to be possible, we must separate the theory of experience, the theory of the event, and the theory of mechanisms. Bhaskar shows that science can be defined on a level of metatheory, on the transdisciplinary scope that science needs to have. Ranefors suggests that we can operate science not just at the transdisciplinary scope but also by integrating transdisciplinary scientific approaches at an archdisciplinary scope.

We must proceed with caution as we apply unification metatheories and archtheories to a discipline – the third and fourth theoretical scope operations. While

---

becomes more well defined as we find similar applications, be the subject of matter (alchemy) or immaterial (belief).

theories are proposals for a standard of truth demonstrated and validated with evidence, from a higher-order theory perspective we tend to find that a theory has embedded misconceptions (due to arbitrary non-considerations). Thus in this context, since each archtheory builds on existing unification metatheories, they are first to be treated as a well-formulated theory that can incrementally guide scientific research, and secondarily as potential high-precision truth or indication of existence in the traditional sense of its ontology.

For discussion, we anticipate archtheories to be self-referential, such that arches are enacted in describing them. It is further anticipated that an archtheory can treat itself, unification theories, metatheories, and theories as objects for research and inter-coordination between them. Additionally, a higher-order theory – an archtheory – can make more precise descriptions and boundaries regardless if these originate from a particular ontology/methodology/epistemology. This archtheory precision can be applied to theoretical scope frameworks. As such, Ranefors suggests an archtheoretical methodology representing a non-arbitrary upgrading of the various scopes of theory. Furthermore, we expect to expand the scientific method or produce complementary methods since unification metatheories, after all, often come packaged with some form of methodological pluralism.

Barker

While Hedlund and Esbjörn-Hargen's approach describes what archdisciplinary methodology can look like in practice across unification metatheories, and Ranefors approach describes archdisciplinary methodological application downward to upward improve existing theory and practice spaces, Barker's approach describes the underlying mechanisms of what archdisciplinary methodology entails for constructing archtheory itself. To contextualize Barker's approach, we must discuss the means in which Barker derived an arch originally, and where the notion of archdisciplinarity first occurred to him. Through this case example, a general archdisciplinary methodology will be described.

Comparative analysis is the assessment of two or more unification metatheories in search of their commonalities among the parts, relations, and systems described by

the works being compared. The act of comparison is a natural cognitive operation which takes expression in virtually all meta-languages and descriptions of cognitive function such as Kant's totality and synthetic judgment (2004/1781), Hegel's synthesis (1977), Carnap's synthesis (1938), Frege's generality (1879), Peano's intersection and union (1888), Hilbert's conjunction (1927), Fraenkel's pairing and union (1973), and Tarski's ∀ for all truth function (1956). However, the sequence in which comparative analysis occurs in the behavior of assembling schemas, has been brought to bear through stage generator models, for example in Piaget's accommodation and equilibration (2013/1950), Fischer's singular action, action mapping and action systematizing across tiers of skill (1980), Cook-Grueter's integration (2013), and Commons and Ross's smash transition dynamics (Commons, 2002; Ross, 2008). Barker builds on and continues in this lineage.

Barker's first insights about arches, archdisciplinarity, and archtheory as concepts derived from observations between two unification metatheories in 2011-2013 during his Master's studies. Barker had neared the completion of a book entitled *The Spectrum of Human Imagination* (SHIM) before meeting Commons and Ross (the book he would eventually decide to not publish, though he wrote about SHIM in detail in his Master's thesis). SHIM described universal architectures of human representation which appeared to persist across all times and places, yet took on various expressions across personal experience and culture – it was domain general (Barker, 2013). For Barker, his universal classes were architectural. In this model, for every universal class, there was fractal repeating patterns of units of qualia assembly (representations), structural relations between qualia assemblies (relations between representations), and an overall result (new kind of representation), and that this sequence repeated in the universal classes of the spectrum, creating levels. For example, one class was called *Organon*, and described universal categories of organisms. *Organon* consisted of *anatome* (anatomical units), *animatus* (animation), and *organizatio* (organization). This sequence repeated at each level of building blocks of metabolic entities: cells were anatomical units which had animative relations with other cells which together organized into tissues, tissues were anatomical units which had animative relations with other tissues which together organized into organs, and so on (see Barker 2013's thesis accompanying table).

However, Barker noticed a similar pattern in the Model of Hierarchical Complexity (MHC) (Commons, 2008). MHC described universal processes of human behavior which appeared to persist across all times and places, and took on various expressions across personal experience and culture – it was also domain general. The MHC described a fractal repeating pattern of what behavioral processes are (actions), what behavioral processes do (coordination between actions), and an overall result (systematization of actions that increase complexity to a new level). For example, one universal class was called the sentential stage. Sentential stage describes the behavioral process of creating a sequence. It's action units are nominalization, where for example, something is named (in the transition dynamics, this is the equilibrium transition step). Nominal actions are coordinated in relationship to each other (negation, complementation, and relativism transition steps). The relations are conjoined together into a sequence (smash transition steps) where one can, in this example, construct a sentence (successful sentential action) out of words (nominal units) (see Commons et. al., 2014a).

Barker was perplexed by this similarity of fractal form, because for Barker, SHIM described architectural units, architectural relations, and architectures of systems. Yet for Commons, MHC described process units, process relations, and process systems. Commons' MHC could describe the universal processes that occur in SHIM's universal classes of representation, and SHIM could describe all the universal classes of representation that MHC could measure. Yet their frameworks were inversions with each other. In conversation about this conundrum between Barker and Commons, Commons suggested looking to Gödel's theorems for clues. Commons' reasoning was that this was a clear case of two schemas with sufficient evidence to support them, yet to resolve this dilemma would require explanation that neither model was fitted to explain.

In looking into Gödel's theorems more closely, Barker followed the lineage of the development of the ideas through Church, Turning, Tarski, and others. What Barker and Commons found was that what Gödel was describing was stage and transition in mathematics and logic without any unification metatheoretical ontology in which to ground it. Turing (2012/1938) and Church (1940) showed that there were universal calculatory properties that held across domains (recursion, types, operations, and functions), but without unification metatheories, they could not be clearly

demonstrated across the larger scope of human knowledge and experience, only in the specific case of languages and meta-languages in which were the units of analysis in the earlier observations. Gödel's completeness was thus discovered by Commons and Barker as the architectural and processual equilibrious state of any entity or action, and the move from inconsistency towards consistency was the transitional operations of going from one level/stage of architecture or process to the next. The recursion of type-operation-function as an arch now could be shown to hold across universal architectural classes of representation and the universal processual classes that operate upon and transform their expressions. Thus, the insolvable post-modern relativistic conundrum that Gödel's theorems had been thought to lock us into, were actually just natural, fractal processes that are intrinsic to evolving complexity. As Turing suspected, with a sufficiently high enough level in the hierarchy of stacking axiomatic systems, it could be demonstrated there are axioms that hold across Gödel iterations. Both Barker and Commons' models, when put side by side, indeed revealed an archetypal pattern intrinsic to cognition, and reached this threshold.

For Barker, this was a breakthrough, because it proved that absolute truths exist, and could be shown to persist through any architectural or processual rendition of reality with a high resolution of detail and no black boxes. As mentioned earlier in the booklet, holons existed historically as far back as the Greeks, and mathematical descriptions had existed in the earlier part of the 20th century as mereology from Leśniewski (Surma et. al., 1991) and others. The term "holon" was coined as a term a bit later by Koestler (1967), and later described by Wilber (2000b) as the units of his unification metatheory (integral theory, now often called integrative metatheory), though here we put forth that the universal computation holds beyond just notions of holons, but also across Wilber's notions of heaps, wholes, and artifacts. These characteristics were alluded to in things like cybernetics (Wiener, 2019) and systems theory (Capra, 1996), but there had been no formal description of the exact procedure and precise mechanisms that articulate the universal computation of the recursive unit-relation-system that could hold across unification metatheoretical ontologies. Either descriptions of the phenomena were domain specific with a good amount of detail for a given scope, or generalized across scopes with not enough detail to the specific mechanisms.

Barker introduced the terms static, dynamic, and multinamic as terms that could hold for both SHIM, MHC, and others. Static units were equilibriums (satisfiability), dynamic was action between equilibriums (junctures), and multinamic was the combination of static and dynamic together (collation). Multinamic became a new static unit at the next higher level. This meant that static was within its interior both an entity and action simultaneously, which later was found in Landry as eventities (2009/2002). Thus, Commons and Barker made observations with differing emphasis on certain universal characteristics that were simultaneous within a given occurrence of a multinamic/eventity. Barker applied this fractal phase calculus on his previous model, and revised it with the new findings, following with a comparative study of process theories across not just developmental psychology and social sciences, but processes found in the formal and natural sciences as well. This led Barker to convert his spectrum of imagination into an architectonic of simulation which described orders of the capacity for humans to simulate: computation, ratiocination, and instantiation, where computation describes the universal computation, ratiocination describes the means in which universal computation computes as universal classes that can be architectural or/and processual, and instantiation describes specific real world occurrences in which are expressions of computation and ratiocination. In this way, static-dynamic-multinamic take on architectural or processual characteristics and are inherited into universal classes depending on which of the architectural or processual orientations are being taken. For example, *organon* was updated to be called "apparatus" to hold not just for organisms, but for non-living entities as well such as machines*,* with *anatome* becoming apparatic static, *animatus* becoming apparatic dynamic, and *organizatio* become apparatic multinamic. For architectures, the computational properties look structural. For processes, the computational properties look behavioral. But the computational properties nonetheless exhibit both static and dynamic properties in any given instanced system, since any entity or action cannot be without interior entities and actions (multinamisms).

Barker's archdisciplinary methodology for comparative analysis therefore derived from an examination of the arch of universal computation, complexity, and levels, and described properties of increasing complexity which necessarily includes the comparative analysis itself. *Fractal phase calculus,* which was partially described in

his dissertation, is described and updated further here. Fractal phase calculus describes a self-similar gradation mapping of all possible states and transitions of any given system. It is tripartitically symmetrical, meaning that each computational characteristic in the system associates to every other state.

The fractal phase calculus begins with universal computation, whereas recursion is the domain, and its modalities are static, dynamic, and multinamic. From recursion of these modalities into tessellations, are produced interiority (subjectivity) and exteriority (objectivity), and transjectivity (pervasiveness across interiority and exteriority). This is proposed to be what generates complexity – that is, horizontality (unit-relation-systems within a level), verticality (unit-relation-system stacking of level in a hierarchical, embedded fashion), and diagonality (unit-relation-systems being related to any other level in a panarchical, heterarchical fashion).

From this, we can define two sets of axioms, called phasic linear and phasic nonlinear axioms which describe the systems of relationships between any given units of analysis. Phasic liner axioms describe single dimension trajectories, whereas phasic nonlinear axioms describe multiple dimension trajectories. Below, any of "a", "b", and "c" can describe variable units, relations, and/or systems at a level. The symbols ">" and "≥" confer the meaning of greater than and equal to or greater than. "φ" designates mappings (the capacity to map a real word case onto an architectural or/and processual mapping schema. "∘" is a concatenation which can be static, dynamic, or multinamic in nature. The phasic linear axioms are directly derived from Commons (Commons et al, 2014a). The phasic nonlinear axioms were introduced by Barker (2013).

Table 2: Phasic linear and nonlinear axioms. Adapted from *Barker, C.D. (2013) A fractal phase calculus for recursive architectonic computability (Master's thesis)*

Phasic linear axioms	Phasic nonlinear axioms
Linear Transitivity if a > b and b > c, then a > c	Nonlinear transitivity if a > b and b > c, and c > a, then c ≥ a and b ≥ c
Linear Order if a > b, then φ (a) > φ (b)	Nonlinear Disorder if a > b > a, then φ (a) > φ (b) > φ (a)
Linear chain φ(a ∘ b) = max (φ(a), φ(b)) if φ(a ∘ b) = φ(b ∘ a)	Nonlinear chain φ(a ∘ b) = max (φ(a), φ(b)) n-dimension if φ(a ∘ b) = φ(b ∘ a)
Linear coordination φ(a ∘ b) = max (φ(a), φ(b)) + 1 if φ(b) = φ(a) and φ(a ∘ b) ≠ φ(b ∘ a)	Nonlinear coordination φ(a ∘ b) = max (φ(a), φ(b)) n-dimension +1 if φ(b) = φ(a) and φ(a ∘ b) ≠ φ(a ∘ b)

The linear transitivity describes a horizontal or vertical complexity sequence, and the nonlinear transitivity describes diagonal complexity. The linear order and nonlinear disorder axions describe how an observation can be mapped on the horizontal, vertical, and diagonal complexity. The linear chain axiom describes horizontal complexity, and nonlinear chain axiom describes horizontal complexity produced diagonally. The linear coordination axiom describes vertical increase in complexity, and the nonlinear coordination axiom describes increase in complexity diagonally. These axioms are proposed to be sufficient to axiomatize the rules for how fractal phase calculus transformations occur.

The fractal phase calculus transformations are as follows in the table below. It consists of three transitions through static, dynamic, and multinamic modalities, and for each transition there exists three states, which themselves consist of static, dynamic, and multinamic modalities. This produces a complete permutation of all possible relations between static, dynamic, and multinamic – a tripartitic symmetry – and from it, a sequence. Here, ● is static, ○ is dynamic, and ⊙ is multinamic. Δ confers that what exists within parentheses () are in flux and embedded. In slightly more vernacular terms, static transition is characterized by satisfiability, dynamic transition by juncture, and multinamic transition by collation. For each transition, they have satisfiability, juncturing, and collative phase states in a fractal-like structure. For example, the activity of computing a unit-relation-system assembly

through static transition's satisfiability, means that the assembly goes through satisfiability, juncturing, and collative operational states within the context of determining satisfiability about itself by some related criterion. In essence, the table below (Table 3) describes explicitly the natural order in which computation occurs in order to produce a more complex cognition. Fractal phase calculus is proposed to hold for both living and nonliving eventities (hence the use of the word "thing"), though here we are considering this applied specifically to human capacity to simulate.

To put this into use as a method, let's look at the transitional process of fitting together unification metatheories as a forward computation. During the static transition, unification metatheories are determined to be satisfiable or not by relating them to some set of criteria, which often can be from the lens of another unification metatheory. Where unification metatheories are deemed satisfiable, they become units at the dynamic transition, where satisfiable unification metatheories are related to each other. This is to say, where two or more unification metatheories are held to have validity simultaneously, and where the relationships between them begin to be explored and applied, integrative pluralism starts to change into an integrative unification towards an archtheory. A move is made where looking at unification metatheories is no longer grounded in looking through the lens of one particular unification metatheory, but one zooms out and sees each being held as being valid. Successful dynamic transition within its multinamic state relates components of the unification metatheories in search of sameness, similarity, and difference, and yields arches. These arches are then related to each other as organizing units for which an archtheory can be fitted together through the multinamic transitional process. Unification archtheory is different from an archtheory only where the breadth of unification metatheories being related through this phasic transitional process (horizontal units being coordinated at once), reaches a maximal threshold.

Table 3: Fractal phase transformations and historical analogs

Transition	State	Vernacular	Commons	Fischer	Hilbert	Tarski
(1) Static trans. Satisfiability (~,¬) Δ●	(1) Static state Satisfiability by satisfiability Δ●(Δ●)	A thing exists by itself.	(1) Temporary equilibrium a=a'with b'	(1) Single action A single organized reflex, action, representation, or abstraction		
	(2) Dynamic state Juncture by satisfiability Δ●(Δ○)	A thing has a relationship to something else.	(2) Negation or complementation b		¬ Negation	"A" is true if, and only if, A. "¬A" is true if, and only if, "A" is not true.
	(3) Multinamic state Collation by satisfiability Δ●(Δ⊙)	The things having a relationship become a set of things, a system.				
(2) Dynamic trans. Juncture (∨, ∧) Δ○	(4) Static state Satisfiability by juncture Δ○(Δ●)	The set, as a new unit, exists by itself.		(2) Mapping of actions Coordinations between two or more single sets. A mapping arises when an individual constructs a skill by putting together two lower level single sets		
	(5) Dynamic state Juncture by juncture Δ○(Δ○)	Within the set, there are different variations within a given relationship.	(3) Relativism a or b		∨ Disjunction ∧ Conjunction	"A∨B" is true if, and only if, A or B or (A and B). "A∧B" is true if, and only if, A and B.
	(6) Multinamic state Collation by juncture Δ○(Δ⊙)	The different variations within a relationship, become identified as a set itself, a system.	(4) Smash-0 a and b			
(3) Multinamic trans. Collation (<, >, ≠, =) Δ⊙	(7) Static state Satisfiability by collation Δ⊙(Δ ●)	The set of ways the things have relationships, as a new unit, exists by itself.	(5) Smash-1 Subsets included but not coordinated	(3) System of actions Bring together two lower-level mappings into a single, seamless skill		
	(8) Dynamic state Juncture by collation Δ⊙(Δ ○)	The ways the things have relationships, have relationships to each other.	(6-7) Smash-2, 3 Over and under generalizing		< Lesser than > Greater than = Equal to	"∃x(Fx)" is true if, and only if, there is an object x which satisfies the sentential function F.
	(9) Multinamic state Collation by collation Δ⊙(Δ ⊙)	The relationships between the types of relationships become a system	(8) New equilibrium as the next order of complexity			"∀x(Fx)" is true if, and only if, every object x satisfies the sentential function F.

Note that the analysis of a unification metatheory into its composition requires a backward calculation/computation, where the static state of a unification metatheory in the static transition, is divided into its interior fractal phase transformation states as one creates an interior simulation of a unification metatheory in which a comparison will be made. The procedure of comparative analysis means dividing two or more unification metatheories into their composite

part-relation-systems, with each of the parts in their systems divided further in search of what the unification metatheories have the same, similar, and different, and looking at the system context across it's levels of architectural and processual building blocks for what is the exact causality for sameness, similarity, and difference. There is a tracing their construction backwards, such that their levels of architectural and processual compositions of part-relation-systems can be related to each other in an overall structured constellation. Thus, unless one begins the comparative analysis with a perfect symmetrical rendition of the unification metatheories being compared, forward computation oscillates with backward computation, as one generates that simulation of unification metatheories in more detail, gathering enough representations with a high enough level of specificity in order to have an adequate simulated composition required in mind, to move computation forward.

In Barker's architectonic of simulation model, he proposes universal architectural and processual ratiocinative classes. Ratiocinators are the means in which computation computes – universal classes that populate integrative levels. Barker describes nine process ratiocinations which follow a general sequence – automation, transduction, concretion, abstraction, principiation, paradigmatization, panoptic, phasic, and deitic. All have unique action forms that only are brought out of latency from coordination of the processual ratiocinator schemas that precedes another in the linear sequence, yet all exhibit identical universal calculable phase transformations within their unique actions forms, and therefore exist in a multi-fractal of embedded levels of compounding complexity. For example, the unique action of automation is processes involving presence and absence in binary processes, transduction with input-throughput-output units in network processes, and concretion with specific states that occur across a network. Barker locates archdisciplinary unification metatheory synthesis at phasic process ratiocination. In short, the paradigmatic process ratiocination is the coordination of paradigmatically processed schemas, relationship between paradigmatic schemas, and the overall systematization of paradigms as the units for the following stage, called panoptic ratiocination. Barker defines panoptic ratiocination as taking systematizations of paradigmatic schemas as units, and coordinating them with other units of systems of paradigms, which, with a sufficient breadth, produces theory of everything, unification metatheoretical models. Phasic ratiocination follows, taking the panoptic

systems – unification metatheories – as units. The unification metatheories are related to each other, identifying fundamental properties and categories (arches) that hold across their respective panoptic systems (unification metatheories), and systematization of these unification metatheories along their arches across their meta produce frameworks in which an archtheory can be assembled. The final process stage that follows from this, is what Barker terms deitic processes, which is essentially the capacity to coordinate singularity processes, relations between singularity processes, and singularity process systems. While unification metatheories will have arches within them, unification metatheories cannot identify and verify their arches without comparative analysis with other unification metatheories at the same scale of complexity, as there is no means to otherwise derive such a comparison.

Thus, Barker's methodology entails locating where schemas exist in the larger trajectory of ratiocinative processual evolution, and getting super clear on what transition and state a given archdisciplinary activity expresses as a function of universal computation of cognition/simulation. Correct performance of archdisciplinary comparative analysis must have clear and precise representation of the panoptic coordinations of the unification metatheories, the paradigmatic systems that are systematized as units in the unification metatheories, the principles in which each paradigm in each system builds on, the abstract systems that the principles derive, and the concrete real world things in which the quantifications are abstracted – according to the given scope in which a comparative analysis focuses. For Barker, this means that where people get stuck, the exact ratiocinative process, phasic transition, and phase state in which a hindrance is occurring can be precisely defined, and solutions can be algorithmically designed and tested out for effectiveness. Those performing archdisciplinary activities may therefore have a means in which to contextualize where they are at in the larger scope of the assembly of new conceptions, as well as see how what is being done will fit forward into future outcomes in our shared sociocultural evolutionary trajectory of knowledge advancement – with no black boxes.

And lastly, Barker puts forth the notion that the investigation, identification, naming, and cataloging of arches that hold across the meta does not require any ideological commitments from scholars who perform the inquiry – neither towards the

unification metatheories they compare, nor the arches, relations between arches, or systems of relations that are identified to hold across the unification metatheories. The tracing of why differences exist between such metatheories, can be described without evaluating the truth value of the unification models being compared. Alluding to what Ranefors describes above, science – the generating of hypotheses, testing of hypotheses, reporting of data, independent verification of a hypothesis as a theory, and independent verification from other parties towards law and absolute truths – appears to be a scale-free endeavor.

The Archdisciplinary Research Center

ARC's mission

The mission of ARC is to advocate for transdisciplinary, theory of everything, widely-encompassing metatheoretical work by 1) providing fellowship for academic and independent scholars, 2) facilitating cooperation among metatheoretical communities, 3) supporting novel, comparative, and applied research, and 4) offering education opportunities and consultation services for both individuals and varying sectors of the public. ARC currently consists of three divisions to get coordinated on this front: research, education, and community, with agency later planned. Here, we will convey our present, ongoing, and future directions.

Anticipations

There are several things we anticipate. First, we anticipate that there will be a diversity of archtheory proposals, both in terms of individual arches, what their natural relations are, and how they can be systematized, though we do not know the extent of diversity. As previously described, many archtheoretical models already exist, for example with Turing and Church's universal computation across meta-languages, Esbjörn-Hargens' complex integral realism (2015), and Hedlund's visionary realism (2021). Where archtheoretical proposals are different, we advocate for and aim to facilitate deliberation between parties to understand how differences in archtheoretical systems occur and reconcile the differing views in a way where everyone's views are fairly represented towards a unification archtheory.

Second, we anticipate that there will be other organizations that will formalize towards similar ends as what ARC is about. Archdisciplinarity, archtheory, and arches are names given to this specific scope of academic inquiry, and are not intended to be treated as intellectual property of ARC. Rather, these are generic terms we provide that can be used to identify collectively what this scope of inquiry is in independent or academic scholarship. While we encourage people to share common language for overall communicability, we anticipate that people will borrow the underlying concepts we present, and change terms and definitions into alternative frameworks. We encourage all upcoming organizations to be clear to their audiences about synonymity, and to collaborate with other organizations with other frameworks towards shared objectives.

Third, we anticipate that many scholars with all-inclusive metatheoretical models will incorporate findings into, and improve their models. For example, Barker updated his proposed unification metatheory *Spectrum of Human Imagination Model* (Barker, 2013) with the arches of universal computation of types, operations, functions, and recursivity, resulting in major revitalization of the model into an archtheoretical *Architectonic of Simulation* (Barker, 2019a; 2019b; 2019c; 2022). Henriques has also put much effort in discussing intersections and commonalities between the Unified Theory of Knowledge and other big picture unification metatheorists and their work, demonstrating how this can be done both socially and technically (2020a).

Fourth, it thus follows that we anticipate that scholars will find verification of aspects of their unification metatheories by observation of similar conclusions that other scholars came to independently from a wide variety of different metatheoretical approaches. Archtheories do not make obsolete unification metatheories – rather, archtheories build on the stable units that are the unification metatheories, so we have great interest in seeing them be as successful as possible in their own right. Elements of unification metatheories (as well as metatheories and theories in general) that are independently verified through multiple paths of detection across multiple methodological pluralisms have a high probability of describing something true and elevating elements of (unification(meta))theory into stable law or absolute truth that can be widely independently verified across any given domain example.

Fifth, the topic of ethics is pervasive across unification metatheories, and we anticipate that comparative studies across unification metatheories of ethics will lead to improved ethical understanding for both the archdisciplinary project, and humanity as a whole. As previously described, we believe that finding common ground must come first between parties, and that after mutuality and trust has been established, then critical analysis can be done in productive ways. We expect the occasional bad faith actors who wish to destabilize and divide collective efforts, both in terms of individuals and special interest groups, and we trust both the centralized and decentralized collective intelligence and wisdom of the community to see through such eventualities and manage them with the ethics and intelligence that such big picture frameworks afford us.

Conclusion

Discussion

The entire history of the human species has been characterized by moving from lesser to greater degrees of resolution and detail about the reality that we live in. In cosmic time, the human species is very young, and we are still learning limits of what is possible for us to know, do, and achieve. Many have claimed that something cannot be done – until someone came along and did it.

Antithetical critics and the reasons they give at any scope or scale can be invaluable for considering what may not work, in the process of a researcher looking for a way that does. "This is not possible because x" statements in whatever their variation, can either reveal what the critic does not understand, or what a researcher may not have considered. It requires integrality, honesty, discernment, and a preparedness on the part of researchers to accept limitations in understanding and fallacy no matter if it exists in the critic or the researcher themself, even if the critic may not hold such values for constructive discussion. Good science means not getting one's identity too tied up in a particular framework, and being willing to update one's sensemaking as new data comes to light. Therefore, listening to what critics have to say is beneficial. If nothing else, the researcher learns deliberate or incidental strategies and circumstances in which both good faith and bad faith actors employ,

and these can be opportunities for the researcher to practice healthy dynamics for how to deal with such situations.

The most common argument against finding universal truths can be given in the example of Rescher. Rescher characterized properties of what he terms an ultimate theory in *The price of an ultimate theory* (2000). First, he states that there must be sufficient reason where every fact must be given an explanation. Second, such a theory must be comprehensive enough such that the theory can give explanation to any proposition. Third, there must be no deeper explanation other than the theory itself. Rescher points out that this is an issue because where an ultimate theory is taken as a fact, and where no fact can explain itself, then an ultimate theory cannot explain itself. Rescher's characterization of the incompleteness of ultimate theories is basically a reformation of Gödel's theorems in the context of ultimate theories, i.e. unification metatheories.

We here agree that there is indeed a larger scope of integration that goes beyond any currently existent ultimate theories. However, as described above, Turing showed in his thesis (1938) that a system can exhibit recurrent axioms that hold across Gödel recursions if they are a high enough level in the hierarchy of a system (starting with recursion itself). The argument that "ultimate theories cannot explain themselves" exhibits universal computation in the very argument itself (satisfiability negation in units of cognition (static) having relation to other units of cognition (dynamic) as an overall system (multinamic), and infers notions of integrative levels (a bigger theory exists in a larger context in which is required to explain another scope of theory). Archdisciplinarity is yielding arches that not only hold across Gödel recursions, but define it's functionality. These kinds of candidates for universal pattern laws are what archdisciplinarity as an endeavor seeks to find. That arches can be shown to be intrinsically present in the argument against them is a sign we're onto something here. This booklet has demonstrated that though there is a wide diversity of unification metatheoretical frameworks, there are in fact common arches that persist across them, which are good candidates of laws.

Where arches turn out to be universal pattern laws of cognition and nature, we have good reason to believe that this would yield a new means to understand, predict, and operate on local to global systems in a way never before achieved, vastly

improving our ability to symmetrically represent ourselves, the world, and the universe, and amplify the scope, breadth, and depth of our precision and success towards finding and implementing real solutions to make a better world.

Concluding remarks

This booklet can be considered a snapshot of the current state of affairs of archdisciplinarity, and the Archdisciplinary Research Center (ARC). An annual report will be published yearly in *The Journal of Archdisciplinary Studies* that will provide an update on the current state of the field as it progresses.

References

Adyahanzi, Dempsey, B. G. (2022). *Emergentism*. Palimpsest Press.

Alderman, B. (2016). Integral in-dwelling: A prepositional theology of religions. *Consciousness: Ideas and Research for the Twenty-First Century, 4(*4), 2.

Alderman, B. (2019). *Sophia speaks: An integral grammar of philosophy.* (Unpublished manuscript)

Alderman, B., Pascal, L. (n.d.) *Also/Perhaps*. (Manuscript in preparation)

Alderman, B., Pascal, L. (2020). *Meta-models* [The Integral Stage]. YouTube. Retrieved from https://www.youtube.com/playlist?list=PLKQlJulRFruqshdkfMVj9TYtCfpkNZfjA

Alexander, D. M., & Globus, G. G. (1996). Edge-of-chaos dynamics in recursively organized neural systems. *Fractals of brain, fractals of mind, 31-73*.

Alvargonzález, D. (2011). Multidisciplinarity, interdisciplinarity, transdisciplinarity, and the sciences. *International studies in the philosophy of science, 25*(4), 387-403.

Anderson, L. R. (2019) *Metamodernity: Meaning and Hope in a Complex World.* Nordic Bildung.

Ashtekar, A., & Pullin, J. (Eds.). (2017). *Loop Quantum GRavity: The first 30 years* (Vol. 4). World Scientific.

Azarian, B. (2022). *The Romance of Reality*. BenBella Books, Inc.

Bäck, T., Fogel, D. B., & Michalewicz, Z. (1997). Handbook of evolutionary computation. *Release, 97*(1), B1.

Barker, C. D. (2013) *A fractal phase calculus for recursive architectonic computability.* Master thesis, Antioch University Midwest.

Barker, C. D. (2019a, June 1). *The architectonic of simulation* [Architectonics]. Retrieved from https://www.youtube.com/watch?v=x2dzPW-QmWM

Barker, C. D. (2019b, June 9). *The universal prototype* [Architectonics]. YouTube. Retrieved from https://youtu.be/y9-zjfB5Q_0

Barker, C. D. (2019c, June 26). *Computation Simulacra* [Architectonics]. YouTube. Retrieved from https://youtu.be/qc00zV-NLLE

Barker, C. D. [cory.david.barker]. (2020, August 15). *Archaic<->Metamodern resonance & developmental geometry.* Retrieved from https://forum.metamoderna.org/t/archaic-metamodern-resonance-developmental-geometry/868/4

Barker, C. D. (2023). *Architectonic simulation.* (PhD dissertation, in preparation)

Barton, C. C., Paul, R., & Pointe, L. (Eds.). (1995). *Fractals in the earth sciences.* New York: Plenum Press.

Bhaskar, R. (1975/2008). *A realist theory of science.* London: Routledge

Bhaskar, R., Esbjörn-Hargens, S., Hedlund, N., & Hartwig, M. (Eds.). (2016). *Metatheory for the twenty-first century: Critical realism and integral theory in dialogue.* Routledge.

Bhaskar, R. (2008/1993). *Dialectic: The pulse of freedom.* Routledge.

Bertalanffy, L. (1950). *An outline of general system theory.* British Journal for the Philosophy of science.

Bertalanffy, L. V., & Woodger, J. H. (1938). Modern theories of development. Modern Theories of Development.

Biglan, A. (1973a). The characteristics of subject matter in different academic areas. *Journal of Applied Psychology, 57*(4), 430-463.

Biglan, A. (1973b). Relationships between subject matter characteristics and the structure output of university departments. *Journal of Applied Psychology, 57*(3), 204-213.

Brier, S. (1997). What is a possible ontological and epistemological framework for a true universal 'information science'?: The suggestion of cybersemiotics. *World futures 49.* 287-308.

Brier, S. (2008). *Cybersemiotics: Why Information Is Not Enough!* Toronto, Buffalo, London: University of Toronto Press.

Brier, S. (2013). Cybersemiotics: A new foundation for transdisciplinary theory of information, cognition, meaningful communication and the interaction between nature and culture. *Integral Review, Vol. 9,* No. 2.

Calcagni, G. (2010). Fractal universe and quantum gravity. *Physical review letters, 104(25)*, 251301.

Capra, F. (1996). *The web of life: A new synthesis of mind and matter*. London: Flamingo.

Carnap, R. (1934). *The logical syntax of language*. New York: Harcourt, Brace and Company.

Chandler, J.L.R. (2015). *Organic Mathematics: The architectures of the logical information of natural kinds*. (Unpublished manuscript).

Chandler, J. L. (2017). An Introduction to the Foundations of Chemical Information Theory. Tarski–Lesniewski Logical Structures and the Organization of Natural Sorts and Kinds. *Information, 8*(1), 15.

Chomsky N (1956) Three models for the description of language. *IRE Trans Inform Theory 2*(3):113–124

Church, A. (1936). An unsolvable problem of elementary number theory. *American journal of mathematics, Vol. 58*, pp. 345–363.

Church, A. (1940). A formulation of the simple theory of types. *The journal of symbolic logic, 5*(02), 56-68.

CIRET. (2012). Retrieved July 7, 2022, from http://ciret-transdisciplinarity.org/index_en.php

Coleman, P. H., & Pietronero, L. (1992). The fractal structure of the universe. *Physics Reports, 213(6)*, 311-389.

Commons, M. L., & Chen, S. J. (2014b). Advances in the model of hierarchical complexity (MHC). *Behavioral Development Bulletin, 19*(4), 37.

Commons, M. L., Crone-Todd, D., Chen, S. J. (2014d) Using SAFMEDS and direct instruction to teach the model of hierarchical complexity. *The Behavior Analyst Today 14*.1-2 (2014): 31.

Commons, M. L., & Jiang, T. R. (2014c). Introducing a new stage for the model of hierarchical complexity: A new stage for reflex conditioning. *Behavioral Development Bulletin, 19*(3), 1.

Commons, M. L., & Kjorlien, O. A. (2016). The Meta-Cross-Paradigmatic Order and Stage 16. *Behavioral Development Bulletin, 21*(2), 154.

Commons, M.L., Gane-McCalla, R., Barker, C.D., Li, E.Y. (2014a). The model of hierarchical complexity as a measurement system. *Behavioral Development Bulletin, 19*(3), 9-14.

Commons, M. L., Richards, F. A., & Armon, C. (Eds.). (1984). *Beyond formal operations: Late adolescent and adult cognitive development (Vol. 1).* Greenwood.

Commons, M.L., Richards, F.A. (2002). Organizing components into combinations: How stage transition works. *Journal of Adult Development, 9*(3).

Commons, M. L. (2001). The notion of events and three ways of knowing. *In Metanexus: The Online Forum on Religion and Science.*

Commons, M. L. (2008). Introduction to the model of hierarchical complexity and its relationship to post-formal action. *World Futures, 64*(5-7), 305-320.

Commons, M. L. (2023). *The promise of higher stages and the challenges of demonstrating their existence.* (Manuscript in preparation).

Concern Worldwide. (2022). *World hunger facts: What you need to know in 2022.* Retrieved January 10, 2023, from https://www.concern.net/news/world-hunger-facts-figures

Cook-Greuter, S. (2013). *Nine levels of increasing embrace in ego development: A full-spectrum theory of vertical growth and meaning making.* (Unpublished manuscript)

Copeland, B. J. (Ed.). (2004). *The essential Turing.* Clarendon Press.

Darwin, C. (1909). *The origin of species.* New York: PF Collier & son.

Davies, E. B. (2006). *Epistemological pluralism.* Department of Mathematics, King's College London.

Di Ieva, A. (Ed.). (2016). *The fractal geometry of the brain (Vol. 22).* New York: Springer.

Dempsey, B. G.. (2019). *Metamodern spirituality podcast.* YouTube. Retrieved January 10, 2023, from https://www.youtube.com/playlist?list=PLa_4sU5_wQrlw5b9oc1tDaziHyEqXUnl7

Discipline. (2002). *Webster's Third International Unabridged Dictionary of the English Language.* Massachusetts: Merriam-Webster Inc.

Discipline. (2006). *Collins English dictionary.* New Library World.

Discipline. (2022). *Etymonline.* Retrieved July 7, 2022, from https://www.etymonline.com/word/discipline

Dux, G. (2011). *Historico-genetic theory of culture: On the processual logic of cultural change.* Bielefeld: Transcript.

Edwards, M. G. (2008). Where is the method to our integral madness: An outline for an integral meta-studies. *Journal of Integral Theory and Practice, 3*(3), 165–194.

Edwards, M. G. (2010). *Organizational transformation for sustainability: An integral metatheory*. Routledge.

Edwards, M. G. (2013). Towards an integral meta-studies: Describing and transcending boundaries in the development of big picture science. *Integral Review, 9*(2).

Esbjörn-Hargens, S., Bhaskar, R., Hedlund, N., Hartwig, M. (Eds.) (2016). Developing a complex integral realism for global response. *Metatheory for the Twenty-First Century: Critical Realism and Integral Theory in Dialogue.* Routledge.

Esbjörn-Hargens, S. (2016). Developing a complex integral realism for global response: Three meta-frameworks for knowledge integration and coordinated action. In R. Bhaskar, S. Esbjörn-Hargens, N. Hedlund, & M. Hartwig (Eds.), *Metatheory for the twenty-first century: Critical realism and integral theory in dialogue* (pp. 99–138). Routledge.

Farley, B., & Clark, W. (1954). Simulation of self-organizing systems by digital computer. *Transactions of the IRE Professional Group on Information Theory*, *4*(4), 76-84.

Faivre, A., & Needleman, J. (Eds.). (1993). *Modern Esoteric Spirituality.* (K. Voss, Trans.). SCM Press.

Feibleman, J. K. (1954). Theory of integrative levels. *The British Journal for the Philosophy of Science, (17)*, 59-66. Chicago.

Feigenbaum, M. J. (1975). Universality in complex discrete dynamics. *Los Alamos Theoretical Division Annual Report, 1975-1976.*

Fischer, K. W. (1980). A theory of cognitive development: The control and construction of hierarchies of skills. *Psychological review, 87*(6), 477.

Flood, R. (1617). *Utriusque Cosmi Vol. 1.*

Fraenkel, A. A., Bar-Hillel, Y., & Levy, A. (1973). *Foundations of set theory. Vol. 67.* Elsevier.

Frege, G. L. (1879). Begriffsschrift, a formula language, modeled upon that of arithmetic, for pure thought. In *Heijenoort, From Frege to Gödel (pp.1-84)*. Cambridge, MA: Harvard University Press.

Freinacht, H. (2017) *The Listening Society*. Metamoderna.

Freinacht, H. (2019) *Nordic Ideology*. Metamoderna.

Freinacht, H. (2022, February 23). Is metamodernism the last stage of development? Chaos theory might hold the answer. *Metamoderna*. Retrieved August 6, 2022, from

https://metamoderna.org/is-metamodernism-the-last-stage-of-development-chaos-theory-might-hold-the-answer/

Frodeman, R., Klein, J.T., Mitcham, C. (2010). *The Oxford Handbook of Interdisciplinarity*. New York: Oxford University Press.

Gibbons, M., Limoges, C. (1994). *The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies.* Sage Publications Inc.

Gödel, K. (1929). The completeness of the axioms of the functional calculus of logic. In *Heijenoort, From Frege to Gödel (pp. 582-591).* Cambridge, MA: Harvard University Press.

Gödel, K. (1931). Some metamathematical results on completeness and consistency, On formally undecidable propositions of Principia Mathematica and related systems I, and On completeness and consistency. In *Heijenoort, From Frege to Gödel, (pp.592-617).* Cambridge, MA: Harvard University Press.

Goldstone, R. L., Janssen, M. A. (2005). Computational models of collective behavior. *Trends in cognitive sciences*, *9*(9), 424-430.

Goodrick-Clarke, N. (2008) *The western esoteric traditions.* Oxford University Press.

Gorard, J. (2020). Some quantum mechanical properties of the wolfram model. *Complex Systems*, *29*(2), 537-598.

Graeber, D., Wengrow, D. (2021) *The Dawn of Everything: A New History of Humanity.* Farrar, Straus and Giroux.

Grebmer, K. Bernstein, J., Wiemers, M., Reiner, L. Bachmeier, M. Hanano, A. Towey, O. Chéilleachair, R. N., Foley, C., Gitter, S., Larocque, G., Fritschel, H. (2022). *Global hunger index: Food systems transformation and local governance.* Welt Hunger Hilife & Concern Worldwide.

Habermas, J. (1984). *Theory of communicative action. Vol. I: Reason and the rationalization of society* (McCarthy, T., trans.). Boston: Beacon Press.

Habermas, J. (1996). *Postmetaphysical thinking: Philosophical essays.* MIT Press.

Habermas, Jürgen (2003). *On the Pragmatics of Communication*, edited by Maeve Cooke. Cambridge, Oxford: Polity.

Hartmann, N. (1953/1942). *New Ways of Ontology.* Chicago: Regnery.

Hartwig, M. (2007). *Dictionary of critical realism.* Routledge.

Hasell, J., Roser, M., Ortiz-Ospin, E., Arriagada, P. (2022) *Poverty.* [Retrieved January 9, 2023: https://ourworldindata.org/poverty]

Hawking, S. (2001). *The universe in a nutshell.* Bantam.

Hawking, S. (2002). *Gödel and the end of physics*. Dirac Centennial Celebration, Cambridge, UK, July.

Hedlund, N. (2016). Rethinking the intellectual resources for addressing complex twenty-first century challenges: Towards a critical realist integral theory. In R. Bhaskar, S. Esbjörn-Hargens, H. Nicholas, & M. Hartwig (Eds.), *Metatheory for the twenty-first century: Critical realism and integral theory in dialogue (pp. 183–229)*. Routledge.

Hedlund, N. H. (2021). *Visionary realism and emergence of a eudaimonistic society: Metatheory in a time of metacrisis*. Doctoral dissertation, UCL Institute of Education, University College, London.

Hedlund, N., & Esbjörn-Hargens, S. (2022). *Big-picture perspectives on planetary flourishing: Metatheory for the Anthropocene, Volume I.* Routledge.

Hedlund, N., & Esbjörn-Hargens, S. (2023). *Integrative Responses to the Global Metacrisis: Metatheory for the Anthropocene, Volume II*. Routledge. (forthcoming)

Hegel, G., Miller, A. V., & Findlay, J. N. (1977). *Phenomenology of spirit.*

Henriques, G. (2011a). *A new unified theory of psychology*. New York: Springer.

Henriques, G. (2011b). The Fifth Joint Point. In *A New Unified Theory of Psychology (pp. 247-270)*. Springer, New York, NY.

Henriques, G. (2020a). *UTOKing with Gregg* [UTOK | Unified Theory of Knowledge]. YouTube. Retrieved from https://www.youtube.com/@unifiedtheoryofknowledge

Henriques, G. (2020b, November 18). *Can you see the elephant sun god?* Medium. Retrieved January 10, 2023, from https://medium.com/unified-theory-of-knowledge/can-you-see-the-elephant-sun-god-e630dcf5a335

Henriques, G. (2021a, November 6). *The iQuad Coin.* Medium. Retrieved January 10, 2023, from https://medium.com/unified-theory-of-knowledge/the-iquad-coin-1054a22acd4a

Henriques, G. (2021b, October 22). *The iQuad Coin (part II)*. Medium. Retrieved January 10, 2023, from https://medium.com/unified-theory-of-knowledge/the-iquad-coin-part-ii-a4cf33848db9

Henriques, G. (2021c, October 30). *The iQuad Coin (part III)*. Medium. Retrieved January 10, 2023, from

https://medium.com/unified-theory-of-knowledge/the-iquad-coin-part-iii-3020f6
e6465

Henriques, G. (2022). *A new synthesis for solving the problem of psychology: Addressing the enlightenment gap*. Palgrave Macmillan.

Henriques, G., Görtz, D. (2020) *What is Metamodernism?* Psychology Today. Retrieved October 30, 2022, https://www.psychologytoday.com/us/blog/theory-knowledge/202004/what-is-metamodernism.

Henriques, G. (n.d.). Can You See the Elephant Sun God? An Open Letter for a Vision of Humanity in the 21st Century. (*Unpublished manuscript*)

Henriques, G. [UTOK | Unified Theory of Knowledge] (2020). *UTOKing with Gregg*. https://tinyurl.com/ynhk8ewz

Hilbert, D. (1927) The foundations of mathematics. In Heijenoort, V., From *Frege to Gödel*. Harvard University Press, Cambridge, CA, 464.

Huggett, S. A., Tod, K. P. (1994). *An introduction to twistor theory (No. 4)*. Cambridge University Press.

Interdisciplinarity. (1986). *New International Dictionary*. Springfield, MA: Merriam-Webster Inc.

Interdisciplinarity. (1998). *Random House Webster's college dictionary*. Random House.

IPBES (2019). *Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. S. Díaz, J. Settele, E. S. Brondízio E.S., H. T. Ngo, M. Guèze, J. Agard, A. Arneth, P. Balvanera, K. A. Brauman, S. H. M. Butchart, K. M. A. Chan, L. A. Garibaldi, K. Ichii, J. Liu, S. M. Subramanian, G. F. Midgley, P. Miloslavich, Z. Molnár, D. Obura, A. Pfaff, S. Polasky, A. Purvis, J. Razzaque, B. Reyers, R. Roy Chowdhury, Y. J. Shin, I. J. Visseren-Hamakers, K. J. Willis, and C. N. Zayas (eds.). IPBES secretariat, Bonn, Germany.

Institute for Economics & Peace. (2021). *Global peace index 2021: Measuring peace in a complex world*. Available from: http://visionofhumanity.org/reports (accessed January 10, 2023).

ISKO (2021). Retrieved July 7, 2022, from https://www.isko.org/about.html

Jaggard, D. L. (1990). On fractal electrodynamics. In *Recent Advances in Electromagnetic Theory (pp. 183-224)*. Springer, New York, NY.

Jaimungal, C. (2019, October 26). *Noam Chomsky on Jordan Peterson, post-modernism, Foucault and Ali G*. YouTube. Retrieved July 7, 2022, from https://www.youtube.com/watch?v=XeWWz4y1coU

Jameson, F. (1991) *Postmodernism, or, The cultural logic of late capitalism*. Duke University Press.

Jaspers, K. (1953). *The Origin and Goal of History* (Bullock. M., trans). London.

Johnson, A. W., & Earle, T. K. (2000). *The evolution of human societies: from foraging group to agrarian state*. Stanford University Press.

Jowett, B. (1892). *The dialogues of Plato*. New York and London: Macmillan and co.

Jung, C. G. (1963/1953). *Mysterium coniunctionis* (Hull, R. F. C., trans.). New York: Princeton University Press.

Jung, C. G. (2014/1944). *Psychology and alchemy* (Hull, R. F. C., trans). Routledge.

Jung, C. G., Shamdasani, S. E., Kyburz, M. T., & Peck, J. T. (2009). *The red book: Liber novus*. WW Norton & Co.

Kant, I. (2004/1781). *Critique of pure reason*. (Meiklejohn, J., trans.). London: Barnes & Noble Publishing, Inc.

Kegan, R. (1982). *The evolving self*. Harvard University Press.

Kellert, S. H., Longino, H. E., & Waters, C. K. (Eds.). (2006). *Scientific pluralism* (Vol. 19). U of Minnesota Press.

Kleene, S. C. (1938). On notation for ordinal numbers. *The Journal of Symbolic Logic, 3*(4), 150-155.

Kleineberg, M. (2013). The blind men and the elephant: Towards an organization of epistemic contexts. *Knowledge Organization 40*(5), 340-364.

Kleineberg, M. (2017). Integrative levels. *Knowledge Organization 44*(5), 349-379.

Kleineberg, M. (2021). *Integrative levels of knowing: A cognitive-developmental approach to knowledge organization*. Doctoral dissertation. Humboldt-Universität zu Berlin. https://doi.org/10.18452/23212

Koestler, A. (1967). *Ghost in the machine*. Hutchinson & Macmillan.

Kohlberg, L., Hersh, R.H. (1977). Moral development: A review of the theory. *Theory into practice, 16*(2). 53-59.

Kuhn, T. S. (2012/1962). *The structure of scientific revolutions*. University of Chicago press.

Küpers, W., Deeg, J., & Edwards, M. (2015). 'Inter-bridging' bridges and bridging as metaphors for 'syn-integrality' 'in organization studies and practice. *Integral*

Review: A Transdisciplinary & Transcultural Journal for New Thought, Research, & Praxis, 11(3).

Kurzweil, R. (2005). *The singularity is near: When humans transcend biology.* Penguin.

Kusko, B. (1993). *Fuzzy thinking: The new science of fuzzy logic.* Harper Collins.

Landry, F. (2009/2002). *An Immanent Metaphysics.* (Unpublished manuscript)

Latour, B. (2013). *An inquiry into modes of existence.* Harvard University Press.

Lattuca, L. R. (2001). *Creating interdisciplinarity: Interdisciplinary research and teaching among college and university faculty.* Vanderbilt university press.

Loll, R. (2019). Quantum gravity from causal dynamical triangulations: a review. *Classical and Quantum Gravity, 37*(1), 013002.

Luria, I., & Gruberger, P. S. (1969). *Ten Luminous Emanations.* (Y. L. Ashlag, Ed.) (Vol. 2). Research Centre of Kabbalah.

Mandelbrot, B. B. (1982). *The fractal geometry of nature* (Vol. 1). New York: WH freeman.

Mandelbrot, B. B. (1984). Fractals in physics: squig clusters, diffusions, fractal measures, and the unicity of fractal dimensionality. *Journal of Statistical Physics, 34(5)*, 895-930.

Marshall, P. (2016a). Towards a complex integral realism. In R. Bhaskar, S. Esbjörn-Hargens, N. Hedlund, & M. Hartwig (Eds.), *Metatheory for the twenty-first century: Critical realism and integral theory in dialogue (pp. 140–182). Routledge.*

Marshall, P. (2016b). *A complex integral realist perspective: Towards a new axial vision.* Routledge.

Marshall, P. (2012). The meeting of two integrative metatheories. *Journal of Critical Realism, 11*(2), 188–214.

Mathen, J. (2005). *On the inherent incompleteness of scientific theories.* (Unpublished manuscript)

Meta. (2022). *Etymonline.* Retrieved July 7, 2022, from https://www.etymonline.com/word/meta-#etymonline_v_14705

Miller, J. G. (1978). *Living systems.* McGraw-Hill.

Miller, T. R., Baird, T. D., Littlefield, C. M., Kofinas, G., Chapin III, F. S., & Redman, C. L. (2008). Epistemological pluralism: reorganizing interdisciplinary research. *Ecology and Society, 13*(2).

Mitchell, S. D. (2002). Integrative pluralism. *Biology and Philosophy, 17*(1), 55-70.

Mitchell, S. D. (2004). Why integrative pluralism?. *E:CO Special Double Issue Vol. 6*(1/2), 81.

Moran, J. (2010). *Interdisciplinarity.* New York: Routledge.

Murray, T., O'Fallon, T. (2020). A Summary of Research on and with the STAGES Developmental Model. *Integral Review, 15*(2), 1-31.

Mylius, J. D. (1618). *Opus Medico-Chymicum.*

Nagel, T. (1986). *The view from nowhere*. Oxford University Press.

Needham, J. (1937). Integrative levels: a revaluation of the idea of progress. *Journal of Philosophy, 34*(22).

Newell, A., & Simon, H. (1956). The logic theory machine--A complex information processing system. *IRE Transactions on Information Theory, 2*(3), 61-79.

Nicolescu, B., & Ertas, A. (2014). *Transdisciplinary Education, Philosophy, & Applications*. USA: TheATLAS.

Nicolescu, B. (2008). Transdisciplinarity–History, Methodology, Hermeneutics. Management of Information. Knowledge and Wisdom. *Experiential Management, 13*.

Nicolescu, B. (2010). Methodology of transdisciplinarity – Levels of reality, logic of the included middle and complexity. *Transdisciplinary Journal of Engineering & Science, Vol: 1*, No: 1.

Norrie, A. (2010). *Dialectic and difference: Dialectical critical realism and the grounds of justice*. Routledge.

Novikoff, A. B. (1945). The concept of integrative levels and biology. *Science, 101*(2618), 209-215.

Nubiola, J. (2005). The Classification of the Sciences and Cross-disciplinarity. *Transactions of the Charles S. Peirce Society: A Quarterly Journal in American Philosophy, 41*(2), 271-282.

Ogburn, W. F., & Goldenweiser, A. (1928). *Social sciences and their interrelations*. George Allen and Unwin Ltd, London.

Overton, W. F. (2007). A coherent metatheory for dynamic systems. *Human development, 50*(2/3), 154-159.

Panikkar, R. (1999). The intrareligious dialogue. Paulist Press.

Paxson, D. (2012, April 9). *Hyge-Cræft: Working with the soul in the northern tradition*. Hrafnar. Retrieved October 20, 2022, from https://hrafnar.org/articles/dpaxson/norse/hyge-craeft/

Peano, G. (1888). *Calcolo geometrico secondo l'Ausdehnungslehre di H*. Grassmann. Bocca.

Piaget, J. (2013/1950). *The construction of reality in the child*. Routledge.

Pietronero, L., & Tosatti, E. (Eds.). (2012). *Fractals in physics*. Elsevier.

Poledna, P., Barker, C.D. (2023). *A comparative analysis between Immanent Metaphysics and the Architectonic of Simulation*. (Manuscript in preparation)

Poledna, P. (2022). *On Emergent Gravity.* Unpublished Thesis.

Popper, Karl R. (1980). Three Worlds. In McMurrin, S. (Ed.): *The Tanner Lectures on Human Values*. Salt Lake City: University of Utah Press, pp. 141–167.

Read, J. (1884). *From Alchemy to Chemistry*. Dover Publications. New York.

Repko, A. F., Szostak, R. (2012). *Interdisciplinary research: Process and theory*. Sage Publications.

Rescher, N. (2000). The price of an ultimate theory. *Philosophia naturalis, 37*(1), 1-20.

Ritzer, G. (Ed.). (2007). *The Blackwell encyclopedia of sociology* (Vol. 1479). New York: Blackwell Publishing.

Rolston III, H. (2010). *Three big bangs: Matter-energy, life, mind*. Columbia University Press.

Roser, M., Ritchie, H. (2019). *Cancer: Our World in Data*. Retrieved January 10, 2023, from https://ourworldindata.org/cancer

Ross, S. N., Commons, M. L., Li, E. Y., Stålne, K., & Barker, C. D. (2014). Toward defining order 16 and describing its performance for the model of hierarchical complexity. *Behavioral Development Bulletin, 19*(3), 33.

Ross, S.N. (2008). Fractal transition steps to fractal stages: The dynamics of evolution, II. *World Futures, 64*(5-7). 361-374.

Ross, S.N. (2014). Fractal model of nonlinear hierarchical complexity: Measuring transition dynamics as fractals of themselves. *Journal of Adult Development, 19*(3). 28-22.

Rosser, B. (1936). Extensions of some theorems of Gödel and Church. *The Journal of Symbolic Logic, 1*(3), 87-91.

Schelling, T. C. (2006). *Micromotives and macrobehavior*. WW Norton & Company.

Sieg, W. (2006). Gödel on computability. *Philosophia Mathematica, 14*(2), 189-207.

Skinner, B. F. (1957). *Verbal behavior.* New York: Appleton-Century-Crofts.

Skinner, M. K. (2015). Environmental epigenetics and a unified theory of the molecular aspects of evolution: a neo-Lamarckian concept that facilitates neo-Darwinian evolution. *Genome biology and evolution, 7*(5), 1296-1302.

Somerville, M.A., Rapport, D.J. (2002). *Transdisciplinarity*. McGill-Queen's University Press.

Sonnert, G., Commons, M. L. (1992). *Society and the Highest Stages of Moral Development*. Retrieved from https://files.eric.ed.gov/fulltext/ED348600.pdf

Squires, G. (1992). Interdisciplinarity in higher education in the United Kingdom. *European Journal of Education, 27*(3), 201-210.

Stein, Z. (2010). On the Normative Function of Metatheoretical Endeavors. *Integral Review: A Transdisciplinary & Transcultural Journal for New Thought, Research, & Praxis, 6*(3).

Stein, Z. (2019). *Education in a Time Between Worlds: Essays on the Future of Schools, Technology & Society*. Bright Alliance.

Stein, Z. (2022). On realizing the possibilities of emancipatory meta-theory: Beyond the cognitive maturity fallacy, toward an education revolution. In Hedlund, N., & Esbjörn-Hargens, S. (Eds.), *Big-picture perspectives on planetary flourishing: Metatheory for the Anthropocene, Volume I*. Routledge.

Storm, J. A. J. (2021). Metamodernism: The future of theory. University of Chicago Press.

Sumner, A., Tribe, M. (2008). Development studies and cross-disciplinarity: Research at the social science–physical science interface. *Journal of International Development, 20*(6), 751 - 767.

Surma, S. J., Srzednicki, J., Barnett, D. I., Rickey, V. F. (Eds.) (1991). *Stanislaw Lesniewski: Collected Works Volumes I & II*. Springer.

Sweeny, A. (2020, February 13). *Transjectivity*. Medium. Retrieved January 10, 2023, from https://andrewpgsweeny.medium.com/transjectivity-5f280ef1189b

Tarski, A. (1936). The concept of truth in formalized languages. *Logic, Semantics, Metamathematics, 2*, 152-278.

Tarski, A. (1956). Contributions to the theory of models. *Journal of Symbolic Logic, 21*(4).

Theory. (2022). *Etymonline*. Retrieved July 7, 2022, from https://www.etymonline.com/word/theory#etymonline_v_10734

Transdisciplinarity. (2006). *Collins English dictionary*. New Library World.

Turcotte, D. L. (1989). Fractals in geology and geophysics. *Pure and applied Geophysics, 131(1)*, 171-196.

Turing, A. (2012/1938). *A system of logic based on ordinals*. Princeton University Press.

Turing, A. M. (1936). On computable numbers, with an application to the
    Entscheidungsproblem. *Journal of Math, 58*(345-363), 5.

Turing, A. M. (1937). Computability and λ-definability. *The Journal of Symbolic Logic,
    2*(4), 153-163.

United Nations General Assembly. (1948). *Universal declaration of human rights.* UN
    General Assembly, 302(2), 14-25.

UToK (2020). *Utok | Unified Theory of Knowledge.* YouTube. Retrieved July 5, 2022,
    from https://www.youtube.com/channel/UCTb1ZHu5hUms3QcrM9XMzMg

UNHCR. (2021). *Global trends: Forced displacement in 2021.*

UNHCR. (2022). *UNHCR: Ukraine, other conflicts push forcibly displaced total over
    100 million for first time.* Retrieved January 10, 2023 from
    https://www.unhcr.org/en-us/publications/brochures/62a9d1494/global-trends-r
    eport-2021.html

UNICEF, ILO. (2021). *Child labour: Global estimates 2020, trends and the road
    forward.*

UNICEF, World Health Organization, World Bank Group. (2021). *Levels and trends in
    child malnutrition.*

Vermeulen, T., & Van Den Akker, R. (2010). Notes on metamodernism. *Journal of
    Aesthetics & Culture, 2*(1), 5677

Von Neumann, J. (1981). The principles of large-scale computing machines. *Annals of
    the History of Computing, 3*(3), 263-273.

Von Neumann, J. (1993/1945). First Draft of a Report on the EDVAC. *IEEE Annals of
    the History of Computing, 15*(4), 27-75.

Weibel, E. R. (1991). Fractal geometry: a design principle for living organisms.
    American Journal of Physiology-Lung Cellular and Molecular Physiology, 261(6),
    L361-L369.

Wiener, N. (2019/1948). *Cybernetics or Control and Communication in the Animal
    and the Machine.* MIT press.

Wikimedia Foundation. (2022, June 24). *List of academic fields.* Wikipedia. Retrieved
    July 4, 2022, from https://en.wikipedia.org/wiki/List_of_academic_fields

Wilber, K. (2000a). *Integral psychology: Consciousness, spirit, psychology, therapy.*
    Shambhala Publications.

Wilber, K. (2000b). *Sex, Ecology, Spirituality: The Spirit of Evolution, 2nd ed.* Boston:
    Shambhala.

Wilber, K. (2001). *A theory of everything: An integral vision for business, politics, science and spirituality*. Shambhala publications.

Wilber, K. (2007). *Integral spirituality: A startling new role for religion in the modern and postmodern world*. Shambhala Publications.

Williams, R. (1977) *Marxism and Literature*. Oxford University Press.

Wolfram, S. (2002). *A new kind of science*. Champaign, IL: Wolfram Media.

Wolfram, S. (2021, September 9). *Multicomputation: A fourth paradigm for theoretical science*. Stephen Wolfram Writings RSS. Retrieved January 10, 2023, from https://writings.stephenwolfram.com/2021/09/multicomputation-a-fourth-paradigm-for-theoretical-science/

World values survey association. (2022). *WVS Database*. Retrieved January 12, 2023, from https://www.worldvaluessurvey.org/wvs.jsp

WMO (2022). *World Meteorological Organization provisional state of the global climate*. United Nations.

WWF (2022) *Living Planet Report 2022 – Building a nature- positive society*. Almond, R.E.A., Grooten, M., Juffe Bignoli, D. & Petersen, T. (Eds). WWF, Gland, Switzerland.

Young, G. (2011). Development and causality: Neo-Piagetian perspectives. Springer Science & Business Media.

Youngblood, D. (2007). Multidisciplinarity, interdisciplinarity, and bridging disciplines: A matter of process. *Journal of Research Practice, 3*(2), M18-M18.

Unification metatheory Table

Below is an exhaustive but incomplete list of interdisciplinary and transdisciplinary unification metatheoretical concepts and frameworks, ordered by authorship. This table includes some proto-metatheory examples, and cross-domain unifications with varying degrees of breadth and depth. Certain references are here included that are not unification metatheoretical in themselves, yet describe significant contributions that led to and explain unification metatheories and archtheories – that is, frameworks that describe developmental trajectories of behavior. A minor number of frameworks are included that are not unification metatheoretical per se, yet describe big picture ideas and some would argue nevertheless should be considered theories of everything. This table carries over many frameworks cataloged by Kleineberg (2017).

Table 4: Unification metatheory table and explanatory frameworks

Authors	Frameworks	Literature
Agnew, Stephen	Universal quantum action with discrete eather	Agnew, S. (2021). *No space, no time: How the universe actually works*. (Independently published)
Alderman, Bruce	Integral grammatology	Alderman, B. (2016). Integral in-dwelling: A prepositional theology of religions. *Consciousness: Ideas and Research for the Twenty-First Century, 4*(4), 2. Alderman, B. (2019). *Sophia speaks: An integral grammar of philosophy.* (Unpublished manuscript) Alderman, B., Pascal, L. (n.d.) *Also/Perhaps*. (Manuscript in preparation)
Alexander, Samuel	Universal categories of reality	Alexander, Samuel. (1950/1920). *Space, Time and Deity*. London: Macmillan.
Anderson, Lene	Metamodernity, Nordic Bildung	Anderson, L. R. (2019) *Metamodernity: Meaning and Hope in a Complex World*. Nordic Bildung.
Amarasmia	Amarakosha (The immortal collection)	Nair, S. S., & Kulkarni, A. (2010, December). The knowledge structure in Amarakośa. In *International Sanskrit Computational Linguistics Symposium (pp. 173-189).* Springer, Berlin, Heidelberg.
Apel, Karl	Transcendental semiotics	Apel, K. O. (1978). *Transcendental semiotics and the paradigms of first philosophy*.
Aristotle	Metaphysics	Aristotle. (1991). *The Metaphysics* (McMahon, J. M., trans.). New York: Prometheus Books.
Ashtekar, Abhay	Big bang singularity in loop quantum cosmology	Ashtekar, A., Pawlowski, T., & Singh, P. (2006). Quantum nature of the big bang. *Physical review letters, 96*(14), 141301.
Austin, Derek	Classes/levels of entities	Austin, D. (1969). Prospects for a new general classification. *Journal of*

		librarianship, 1(3), 149-169.
Azarian, Bobby	Integrated evolutionary synthesis	Azarian, B. (2022). *The Romance of Reality: How the universe organizes itself to create life, consciousness, and cosmic complexity.* BenBella Books, Inc.
Baez, John & Huerta, John	Algebra of grand unified theories	Baez, J., & Huerta, J. (2010). The algebra of grand unified theories. *Bulletin of the American Mathematical Society, 47*(3), 483-552.
Bäck, Thomas	Natural evolutionary processes for evolutionary computation	Bäck, T., Fogel, D. B., & Michalewicz, Z. (1997). Handbook of evolutionary computation. *Release, 97*(1), B1.
Bachelard, Gaston	Categories of philosophical explanation	Bachelard, G. (1968/1940). *The philosophy of No: A philosophy of the new scientific mind.* New York: Orion Press.
Baker, Maria	Simulation theory	Baker, M. (2022). *Simulation theory: A reference book for simulation theory (A psychological and philosophical consideration).* Simon Dough.
Baldwin, James	Universal categories of cognition	Baldwin, J. M. (1906). *Thoughts and things: A study of the development and meaning of thought, or genetic logic. Vol. 1: Functional Logic, or Genetic Theory of Knowledge.* New York: Macmillan.
Barbour, Julian	Janus point	Barbour, J. (2020). *The Janus point: A new theory of time.* Random House.
Barker, Cory David	Spectrum of Human Imagination	Barker, C. D. (2013) *A fractal phase calculus for recursive architectonic computability.* Master thesis, Antioch University Midwest.
Bates, Marcia	Categories/levels of information	Bates, M. J. (2005). Information and knowledge: An evolutionary framework for information science. Information Research: *An International Electronic journal, 10*(4), n4.
Baudrillard, Jean	Simulacra and simulation	Baudrillard, J. (1994). *Simulacra and simulation.* University of Michigan press.

Beck, Don Edward	Spiral Dynamics	Beck, D. E., & Cowan, C. C. (2014). *Spiral dynamics: Mastering values, leadership and change*. John Wiley & Sons.
Bertalanffy, Ludwig Von	Unification of science	Bertalanffy, L. V. & Woodger, J. H. (1938). *Modern theories of development.* Bertalanffy, L. V. (1950). An outline of general system theory. *British Journal for the Philosophy of science.* Bertalanffy, L. V. (1951). General systems theory: A new approach to unity of science. *Human Biology, 23*(4):302-12
Bhaskar, Roy	Critical realism	Bhaskar, R. (2008). *Dialectic: The pulse of freedom*. Routledge. Bhaskar, R. (2013). *Reflections on MetaReality: Transcendence, emancipation and everyday life.* Routledge.
Blitz, David	Emergent evolution of material, biological, mental, and social entities	Blitz, D. (1992). *Qualitative Novelty and the Levels of Reality.* Dordrecht, Boston, London: Kluwer. Blitz, D. (2013). *Emergent evolution: qualitative novelty and the levels of reality (Vol. 19).* Springer Science & Business Media.
Boeke, Kees	Cosmic view	Boeke, K. (1973). *Cosmic view: The universe in 40 jumps*. The John Day Company.
Bond, Richard	Cosmic web (largest observable structures)	Bond, J. R., Kofman, L., & Pogosyan, D. (1996). How filaments of galaxies are woven into the cosmic web. *Nature, 380*(6575), 603.
Boole, George	Laws of thought	Boole, G. (2005). *The laws of thought, on which are founded the mathematical theories of logic and probabilities*. (Starner, D., Hutchinson, J., Bowden, D., Trans.).
Bostrom, Nick	Simulated reality	Bostrom, N. (2003). *The simulation argument: Why the probability that you are living in a matrix is quite high*. Times Higher Education Supplement.

Brier, Sören	Unified science of information, matter and qualia	Brier, S. (2008). *Cybersemiotics: Why information is not enough!.* University of Toronto Press.
Brown, Donald	Human universals	Brown, D. E. (2000). Human universals and their implications. *Being humans: Anthropological universality and particularity in transdisciplinary perspectives, 156-174.* Brown, D. E. (2004). Human universals, human nature & human culture. Daedalus, 133(4), 47-54
Bunge, Mario	Categories/levels towards unity of knowledge	Bunge, M. (2003). *Emergence and convergence: Qualitative novelty and the unity of knowledge.* University of Toronto Press.
Calcagni, Gianluca	Fractal universe	Calcagni, G. (2010). Fractal universe and quantum gravity. Physical review letters, 104(25), 251301.
Callaghan, Victor	Singularity	Callaghan, V., Miller, J., Yampolskiy, R., & Armstrong, S. (2017). *Technological singularity.* New York: Springer.
Campbell, Donald	Categories/levels of evolutionary epistemology	Campbell, D. T. (2013). Levels of organization, downward causation, and the selection-theory approach to evolutionary epistemology. In *Theories of the evolution of knowing (pp. 7-24).* Psychology Press.
Campbell, Thomas	Unifying across philosophy, physics, and metaphysics	Campbell, T. (2003). *My big toe. Awakening: A Trilogy unifying philosophy, physics, and metaphysics.* Lightning Strike Books.
Cantor, Georg	Transfinite numbers	Cantor, G. (1874). On a qualitative property of all real algebraic numbers, *Journal of Pure and Applied Mathematics, 77* (77): 258-262. Cantor, G. (1915). *Contributions to the founding of the theory of transfinite numbers (Vol. 45).* Dover Publications.
Capra, Fritjof	Systems theory	Capra, F. (1996). *The web of life: A new*

		synthesis of mind and matter. London: Flamingo.
Carnap, Rudolf	Meta-logic	Carnap, R. (1938). *The logical syntax of language.* New York: Harcourt, Brace and Company.
Carr, Bernard & Ellis, George	Multiverse	Carr, B., & Ellis, G. (2008). Universe or multiverse?. *Astronomy & Geophysics, 49*(2), 2-29.
Chandler, Jerry	Organic mathematics	Chandler, J.L.R. (2015). *Organic Mathematics: The architectures of the logical information of natural kinds.* (Unpublished manuscript). Chandler, J. L. (2017). An Introduction to the Foundations of Chemical Information Theory. Tarski–Lesniewski Logical Structures and the Organization of Natural Sorts and Kinds. *Information, 8*(1), 15.
Chaisson, Eric	Cosmic evolution (big history)	Chaisson, E. J. (2002). *Cosmic evolution: The rise of complexity in nature.* Harvard University Press.
Chomsky, Noel	Universal grammar	Chomsky, N. (2007). Approaching UG from below. Interfaces + recursion = language, 89, 1-30. Chomsky, N. (2017, August). The Galilean challenge: Architecture and evolution of language. In *Journal of Physics: Conference Series (Vol. 880, No. 1).* IOP Publishing.
Christian, David	Big history	Christian, D. (2011). *Maps of time: An introduction to big history (Vol. 2).* Univ of California Press.
Church, Alonzo	Lambda calculus	Church, A. (1940). A formulation of the simple theory of types. *The Journal of Symbolic Logic, 5*(2), 56-68. Church, A. (1936). An unsolvable problem of elementary number theory. *American journal of mathematics, vol. 58,* pp. 345–363.

Coats, Edward	Organized wholes	Coates, Edwards J. (1969). *CRG Proposal for a New General Classification*. In classification and information control: Papers representing the work of the Classification Research Group during 1960-1968, edited by Classification Research Group. London: The Library Association, 19–22.
Coleman, Paul & Pietronero, Luciano	Fractal universe	Coleman, P. H., & Pietronero, L. (1992). The fractal structure of the universe. Physics Reports, 213(6), 311-389.
Commons, Michael Lamport	The model of hierarchical complexity	Commons, M. L., Richards, F. A., & Kuhn, D. (1982). Systematic and metasystematic reasoning: A case for levels of reasoning beyond Piaget's stage of formal operations. *Child Development*, 1058-1069. Commons, M.L., Gane-McCalla, R., Barker, C.D., Li, E.Y. (2014). The model of hierarchical complexity as a measurement system. *Behavioral Development Bulletin, 19*(3), 9-14. Commons, M. L., & Chen, S. J. (2014). Advances in the model of hierarchical complexity (MHC). Behavioral *Development Bulletin, 19*(4), 37.
Comte, Auguste	Categories of phenomena & the human mind	Comte, A. (1974). *The essential Comte: Selected from Course de Philosophie Positive* (Andreski, S., ed.). London: Croom Helm.
Conger, George	Universal classes/levels of the material, biological, and neuropsychological	Conger, George P. (1925). The doctrine of levels. *The Journal of Philosophy 22* (12): 309–21.
Cook-Greuter, Susanne	Ego stage development	Cook-Greuter, S. R. (1999). *Postautonomous ego development: A study of its nature and measurement.* Harvard University. Cook-Greuter, S. R. (2013/2005). *Nine levels of increasing embrace.*

		(Unpublished manuscript)
Dahlberg, Ingetraut	Information coding classification	Dahlberg, I. (2008). The Information Coding Classification (ICC): A modern, theory-based fully-faceted, universal system of knowledge fields. *Axiomathes, 18*(2), 161-176.
Damon, William & Hart, Daniel	Categories/levels of self-understanding	William, D., & Hart, D. (1988). *Self-Understanding in childhood and adolescence*. Cambridge University Press.
Davies, Paul & Gregersen, Niels	Information universe	Davies, P., & Gregersen, N. H. (Eds.). (2014). *Information and the nature of reality: From physics to metaphysics*. Cambridge University Press.
Darwin, Charles	Evolution	Darwin, C. (1909). *The origin of species*. New York: PF Collier & son.
Dawson, Theo	Lectica; universal classes of behaviors/skills of people	Dawson, T. (2004). Assessing intellectual development: Three approaches, one sequence. *Journal of Adult Development, 11*(2), 71-85.
Deacon, Terrance	Categories of representations	Deacon, T. W. (1998). *The symbolic species: The co-evolution of language and the brain (No. 202)*. WW Norton & Company.
Descartes, Rene	Innatism	Descartes, R. (2013). *Meditations on first philosophy*. Broadview Press.
Desmond, W.	Metaxology	Desmond, W. (2013). *Desire, dialectic, and otherness: an essay on origins*. Wipf and Stock Publishers.
Deutsch, David	Parallel universes	Deutsch, D. (1997). *The Fabric of Reality*. London: Allen Lane. Deutsch, D. (2011). *The beginning of infinity: Explanations that transform the world*. Penguin UK.
Donald, Merlin	Cognition across human evolution	Donald, M. (2001). *A mind so rare: The evolution of human consciousness*. WW Norton & Company.
Durkheim, Emile	Collective consciousness	Durkheim, E. (2019). The division of labor

		in society. In *Social stratification (pp. 178-183)*. Routledge.
Dux, Günter	Stages of individual and social development	Dux, G. (2014). Historico-genetic theory of culture. In *Historico-genetic Theory of Culture*. Transcript-Verlag.
Edan, Amnon	Singularity	Eden, A. H., Steinhart, E., Pearce, D., & Moor, J. H. (2012). Singularity hypotheses: an overview. *Singularity hypotheses, 1-12.*
Edwards, M.	Sustainability	Edwards, M. (2010). *Organizational transformation for sustainability: An integral metatheory*. Routledge.
Emmeche, Claus	Ontology of levels	Emmeche, C., Køppe, S., & Stjernfelt, F. (1997). Explaining emergence: towards an ontology of levels. *Journal for general philosophy of science, 28*(1), 83-117.
Esan, Olaosun	Pansemiotics	Esan, O. I. (2018). Pansemiotism: A cognitive semiotic reflection on plant, animal and human lives correlates. *Language and Semiotic Studies, 3*(3).
Feibleman, James	Categories/levels of organization and properties of behavior	Feibleman, J. K. (1954). Theory of integrative levels. *The British Journal for the Philosophy of Science (17)*, 59-66.
Feinberg, Todd	Categories/levels of neural self system	Feinberg, T. E. (2011). The nested neural hierarchy and the self. *Consciousness and Cognition, 20*(1), 4-15.
Fenzl, Norbert	Behaviors of information systems at different levels	Fenzl, N., Fleissner, P., Hofkirchner, W., Jahn, R., & Stockinger, G. (1996). *On the genesis of information structures*. Kornwachs/Jacoby..
Ferrier, James	Coined Epistemology	Ferrier, J. F. (1854). *Institutes of Metaphysic: The Theory of Knowing the Mind*. W. Blackwood and sons.
Fischer, Kurt	Dynamic skill theory, categories/levels of skill	Fischer, K. W. (1980). A theory of cognitive development: The control and construction of hierarchies of skills.

		Psychological review, 87(6), 477. Fischer, K., & Yan, Z. (2018). The development of dynamic skill theory. *In Conceptions of Development (pp. 279-312)*. Psychology Press.
Fludd, Robert	Anima mundi, integra natura	Flood, R. (1617). *Utriusque Cosmi Vol. 1.* (The metaphysical, physical, and technical history of the two cosmos)
Forero-Romero, Jaime	Categorization of cosmic web components	Forero–Romero, J. E., Hoffman, Y., Gottlöber, S., Klypin, A., & Yepes, G. (2009). A dynamical classification of the cosmic web. *Monthly Notices of the Royal Astronomical Society, 396*(3), 1815-1824.
Fowler, James & Leven, Robin	Categories/levels of faith	Fowler, J. W., & Levin, R. W. (1984). Stages of faith: The psychology of human development and the quest for meaning. *International Journal for Philosophy of Religion, 15(*1).
Fraenkel, Abraham	Zermelo-Fraenkel Set theory	Fraenkel, A. A., Bar-Hillel, Y., & Levy, A. (1973). *Foundations of set theory (Vol. 67)*. Elsevier.
Frege, Gottlob	Arithmetic of pure thought	Frege, G. (1879). Begriffsschrift, a formula language, modeled upon that of arithmetic, for pure thought. From *Frege to Gödel: A source book in mathematical logic, 1931, 1-82.*
Friston, Karl	Markovian monism	Friston, K. J., Wiese, W., & Hobson, J. A. (2020). Sentience and the origins of consciousness: From Cartesian duality to Markovian monism. *Entropy, 22*(5), 516.
Gebser, Jean	Structures/levels of consciousness	Gebser, J. (2020). *The ever-present origin*. Ohio University Press.
Ghose, Aurobindo	Divine metaphysics	Writings. *Sri Aurobindo - His Writings*. (n.d.). Retrieved January 15, 2023, from https://www.sriaurobindoashram.org/sriaurobindo/writings.php
Gnoli, Claudio	Classifying phenomena	Gnoli, C. (2016). Classifying Phenomena

		Part 1: Dimensions. *Knowledge organization, 43*(6).
		Gnoli, C. (2017). Classifying Phenomena Part 2: Types and Levels. *Knowledge organization, 44*(1).
		Gnoli, C. (2017). Classifying phenomena. Part 3: Facets. *Dimensions of knowledge: facets for knowledge organization, 55-67*.
		Gnoli, C. (2018). Classifying phenomena, part 4: Themes and rhemes. *Knowledge organization, 45*(1), 43-53.
Gödel, Kurt	Completeness and incompleteness theorems	Gödel, K. (1929). The completeness of the axioms of the functional calculus of logic. In *Heijenoort, From Frege to Gödel (pp. 582-591)*. Cambridge, MA: Harvard University Press.
		Gödel, K. (1931). Some metamathematical results on completeness and consistency, On formally undecidable propositions of Principia Mathematica and related systems I, and On completeness and consistency. In *Heijenoort, From Frege to Gödel, (pp.592-617)*. Cambridge, MA: Harvard University Press.
Goldsmith, Mike	Metrology across scales	Goldsmith, M. (2010). *A beginner's guide to measurement. Measurement Good Practice Guide*.
Goldstein, Tyler	Sentient singularity theory	Goldstein, T. (2022). *Sentient singularity theory*. Sentient Singularity. Retrieved January 15, 2023, from https://www.sentientsingularity.com/
Görtz, Daniel	Metamodernism	Freinacht, H. (2017) *The Listening Society*. Metamoderna.
		Freinacht, H. (2019) *Nordic Ideology*. Metamoderna.
Grammaticus, Ammonius	Thesaurus	Grammaticus, A. (4th Century). *On differences of synonymous expressions*.
Graves, Clare	Levels of human and	Graves, C. W. (1970). Levels of existence:

	social development	An open system theory of values. *Journal of humanistic psychology, 10*(2), 131-155.
Habermas, Jürgen	Theory of communicative action, ego identity, worldviews, and social integrations	Habermas, J. (1985). *The theory of communicative action: Reason and the rationalization of society (Vol. 1).* Beacon press. Habermas, J. (1985). *The theory of communicative action: Lifeword and system: A critique of functionalist reason (Vol. 2).* Beacon press.
Hartmann, Nicolai	Categories/levels of nature and consciousness	Hartmann, N. (2019). Ontology: Laying the Foundations. De Gruyter. Hartmann, N. (2013). *Possibility and actuality.* De Gruyter. Hartmann, N. (1940). *The structure of the real world: A general theory of categories.* De Gruyter.
Hawking, Stephen	Physics theory of everything	Hawking, S. (2001). *The universe in a nutshell.* Bantam. Hawking, S. (2006). *The theory of everything.* Jaico Publishing House.
Hegel, Georg	Absolute idealism	Hegel, G. (1830). *Encyclopedia of the Philosophical Sciences in Basic Outline.*
Henriques, Gregg	Unified theory of psychology. Unified theory of knowledge; e.g. Tree of knowledge system, periodic table of behavior	Henriques, G. (2003). The tree of knowledge system and the theoretical unification of psychology. *Review of general psychology, 7*(2), 150-182. Henriques, G. (2011). *A new unified theory of psychology.* New York: Springer. Henriques, G. (2022). *A new synthesis for solving the problem of psychology: Addressing the enlightenment gap.* Palgrave Macmillan.
Hobhouse, Leonard	Levels of the human mind	Hobhouse, Leonard T. (1901). *Mind in Evolution.* London: Macmillan
Hofstadter, Douglas	Recursivity in self-reference	Hofstadter, D. R. (2007). *I am a strange loop.* Basic books.
Hoffman, Donald	Conscious realism,	Hoffman, D. (2008). Conscious realism

	multimodal user interface	and the mind-body problem. *Mind and Matter, 6*(1), 87-121. Hoffman, D. D. (2010). Sensory experiences as cryptic symbols of a multimodal user interface. *Activitas Nervosa Superior, 52*(3), 95-104.
Hoffmayer, Jesper	Semiome, semiotic scaffolding	Hoffmeyer, J. (2014). The semiome: From genetic to semiotic scaffolding. *Semiotica, 2014(198)*, 11-31.
Jaekel, Lukas	Hermetic theory of everything	Lukas, J. (2022). Philobster.com. PhiLobster.com | *Alchemist Theory of Everything*. Retrieved January 13, 2023, from http://philobster.com/
Jantsch, Erich	Self-organizing micro and macro systems, self-organizing mind	Jantsch, E. (1980). *The self-organizing universe: Scientific and human implications of the emerging paradigm of evolution.* Oxford, New York: Pergamon Press.
Jolley, John	Categories/levels of ideas	Jolley, J. L. (1973). *The fabric of knowledge: a study of the relations between ideas.* London: Duckworth.
Judaeus, Philo	Universal forms of Logos	Runia, D. T. (1995). *The works of Philo complete and unabridged: New Updated Version.*
Jung, Carl	Archetypes and the collective unconscious	Jung, C. G. (2014/1959). *The archetypes and the collective unconscious.* Routledge.
Kauffman, Steward	Self-organizing evolution	Kauffman, S. A. (1993). *The origins of order: Self-organization and selection in evolution.* Oxford University Press, USA. Kauffman, S., & Kauffman, S. A. (1995). *At home in the universe: The search for laws of self-organization and complexity.* Oxford University Press, USA.
Kaku, Michio	Physics theory of everything	Kaku, M. (2022). *The God equation: The quest for a theory of everything.* Anchor.
Kant, Immanual	Architectonic	Kant, I. (2004/1781). *Critique of pure reason.* (Meiklejohn, J., Trans.). London:

		Barnes & Noble Publishing, Inc.
Kegan, Robert	Categories/levels of constructive development	Kegan, R. (1982). *The evolving self*. Harvard University Press. Kegan, R. (1998). *In over our heads: The mental demands of modern life*. Harvard University Press.
Kleineberg, Michael	Integrative levels and epistemic organization	Kleineberg, M. (2013). The blind men and the elephant: Towards an organization of epistemic contexts. *Knowledge Organization 40*(5), 340-364. Kleineberg, M. (2017). Integrative levels. *Knowledge Organization 44*(5), 349-379. Kleineberg, M. (2021). *Integrative levels of knowing: A cognitive-developmental approach to knowledge organization*. Doctoral dissertation. Humboldt-Universität zu Berlin. https://doi.org/10.18452/23212
Knezevik, Neven	Eidomorphism	Knezevik, N. (2019). *Eidomorphism*. Independent publication.
Koestler, Arthur	Holons	Koestler, A. (1967). *The ghost in the machine*. Hutchinson & Macmillan.
Kohlberg, Lawrence & Hersh, Richard	Moral development stages	Kohlberg, L., & Hersh, R. H. (1977). Moral development: A review of the theory. *Theory into practice, 16*(2), 53-59.
Korotayev, Andrey	Singularity	Korotayev, A. (2018). The 21st Century Singularity and its Big History Implications: A re-analysis. *Journal of Big History. II (3)*, 73-119.
Kramer, Deidre	Categories/levels of social cognition	Kramer, D. A. (1989). Development of an awareness of contradiction across the life span and the question of postformal operations. *Adult development, 1*, 133-159.
Krantz, David	Foundations of measurement	Krantz, D., Luce, D., Suppes, P., & Tversky, A. (1971). *Foundations of measurement, Vol. I: Additive and polynomial representations*. New York: Dover Publications.

Kuhn, Thomas	Evolution of knowledge	Kuhn, (1996/1962. *The structure of scientific revolutions (3rd ed.)*. University of Chicago Press.
Kurzweil, Ray	Singularity, recursive self-reference	Kurzweil, R. (2005). *The singularity is near: When humans transcend biology*. Penguin. Kurzweil, R. (2013). *How to create a mind: The secret of human thought revealed*. Penguin
Kyle, Barbara	Categories/levels of phenomena	Kyle, B. R. (1969). Lessons learned from experience in drafting the Kyle Classification. *Classification and Information Control: Papers Representing the Work of the Classification Research Group during 1960-1968*, 11-16.
Landry, Forest	Transcendent, immanent, omniscient	Landry, F. (2009/2002). *An Immanent Metaphysics*. (unpublished manuscript).
Langan, Chris	Cognitive-theoretic model of the universe	Langan, C. M. (2002). *The Cognitive-Theoretic Model of the Universe: A New Kind of Reality Theory*. Mega Foundation Press. Langan, C. M. (2020). *Chris Langan's Major Papers 1989–2020*. Mega Foundation Press.
Leibniz, Gottfried	Characteristica universalis, calculus ratiocinator	Leibniz, G.W. (1969/1864). New method for maximums and minimums. In Struik, *A source book in mathematics (pp.271-281)*. Cambridge, MA: Harvard University Press. Leibniz, G. W. (1989/1666). Dissertation on the Art of Combinations. In *Philosophical Papers and Letters (pp. 73-84)*. Springer, Dordrecht. Williamson, M. L. (2012). *The philosophical works of Leibnitz*. Forgotten Books.
Leslie, Brian	Lambda-CDM	Leslie, B. C. (2020). *Cosmology now: Lambda-CDM standard model. What we know and how we know it*. (unpublished manuscript).

Lesniewski, Stanislaw	Set theory	Lesniewski, S. (1992). Foundations of the general theory of sets. *Stanislaw Lesniewski, Collected Works* (Surma, SJ, Srzednicki, JT, Barnett, DI and Rickey, VF, Eds.), Kluwer, Dordrecht, 128-173.
Levy-Bruhl, Lucien	Collective representations, participation mystique	Levy-Brul, L. (2015/1926). *How natives think* (Clare, L. A., Trans.). Martino Fine Books.
Lisi, Antony Garrett	Unified field theory of physics	Lisi, A. G. (2007). *An exceptionally simple theory of everything.* arXiv preprint arXiv:0711.0770.
Lloyd, Seth	Computational universe	Lloyd, S. (2007). *Programming the universe: a quantum computer scientist takes on the cosmos.* Vintage.
Lobo, Ingrid	Categories/levels of biological systems	Lobo, I. (2008). Biological complexity and integrative levels of organization. *Nature Education, 1*(1), 141.
Löffler, Davor	Generative realities	Löffler, D. (2019). *Generative Realities* (Doctoral dissertation, Velbrück).
Lovejoy, Arthur	The great chain of being	Lovejoy, A. O., & Stanlis, P. J. (2017). *The great chain of being: A study of the history of an idea.* Routledge.
Lull, Raymond	Divine principles	Lull, R. (1308). *Ars Generalis Ultima.*
Mac Lane, Saunders	Category theory	Mac Lane, S. (2013). *Categories for the working mathematician (Vol. 5).* Springer Science & Business Media.
Mandelbrot, Benoit	Fractals	Mandelbrot, B. B. (1982). The fractal geometry of nature (Vol. 1). New York: WH freeman.
Maturana, Humberto & Varela, Francisco	Autopoiesis	Maturana, H. R., & Varela, F. J. (1987). *The tree of knowledge: The biological roots of human understanding.* New Science Library/Shambhala Publications. Maturana, H. R., & Varela, F. J. (1991). *Autopoiesis and cognition: The realization of the living (Vol. 42).* Springer Science & Business Media.
Meijer, Dirk	Information universe	Meijer, D. K. F. (2015). The Information

		Universe. On the Missing Link in Concepts on the Architecture of Reality. *Syntropy Journal, 2012; 1:* 1-64.
Mechtly, E.	Measurement across scales	Mechtly, E. A. (1973). *The International System of Units: Physical constants and conversion factors.* Second Revision.
Miller, James	Categories/levels of living systems	Miller, J. G. (1978). *Living systems.* McGraw-Hill.
Mithen, Steven	Categories/levels of general intelligence	Mithen, S. J. (1996). *The prehistory of the mind: A search for the origins of art, religion and science.* London: Phoenix.
Morowitz, Harold	Emergence	Morowitz, H. J. (2002). *How The World Became Complex, The Emergence of Everything.*
Murray, Tom	Post-metaphysical thinking	Murray, T. (2019). Knowing and Unknowing Reality–A Beginner's and Expert's Developmental Guide to Post-Metaphysical Thinking. *Integral Review, 15*(1), 128-249.
Mylius, Johannes Daniel	Balisca Philosophica	Mylius, J. D. (1618). *Opus Medico-Chymicum.*
Needham, Joseph	Categories/levels of phenomena	Needham, J. (1937). *Integrative levels: A revaluation of the idea of progress.* Oxford: Clarendon Press.
Neumann, Erich	Collective consciousness (mythology)	Neumann, E. (1975/1949). *The origins and history of consciousness.* Princeton: Princeton University Press.
Neurath, Otto	Physicalism as unification of the sciences	Neurath, O. (1983). Physicalism. In *Philosophical Papers 1913–1946 (pp. 52-57).* Springer, Dordrecht.
Newton, Isaac	Principles of natural philosophy	Newton, I. (1999). *The Principia: mathematical principles of natural philosophy.* Univ of California Press.
Nicolescu, Basarab	Transdisciplinarity	Nicolescu, B. (2002). *Manifesto of transdisciplinarity.* Suny Press.
Nolan, Patrick & Lenski, Gerhard	Macrosociology	Nolan, P., Lenski, G. (2015). *Human societies: An introduction to macrosociology.* New York: Oxford

		University Press.
Novikoff, Alex	Categories/levels of biological matter	Novikoff, A. B. (1945). The concept of integrative levels and biology. *Science 101 (2618)*: 209–15.
O'Fallon, Terry & Murray, Tom	Domain general stage theory	O'Fallon, T. (2011). *STAGES: Growing up is Waking up—Interpenetrating Quadrants, States and Structures.* Murray, T., & O'Fallon, T. (2020). A Summary of Research on and with the STAGES Developmental Model. *Integral Review, 15*(2), 1-31.
Oppenheim Paul Putnam, Hilary	Unifying science across levels of reality	Oppenheimer, P., Hilary P. (1958). Unity of science as a working hypothesis. In *Concepts, theories, and the mind-body problem* (Feigl, H, Scriven, M., Maxwell, G., Eds). Minneapolis: University of Minnesota Press, 3–36.
Overton, Willis	Categories/levels of discourse	Lerner, R. M., & Overton, W. F. (Eds.). (2010). *The Handbook of Life-Span Development, Volume 1: Cognition, Biology, and Methods (Vol. 1).* John Wiley & Sons.
Panov, Alexander	Singularity	Panov A. D. (2017). Singularity of evolution and post-singular development. From big bang to galactic civilizations. A big history anthology. Volume III. *The ways that big history works: Cosmos, life, society and our future.* (Rodrigue, B., Grinin, L., Korotayev, A., Eds.). Delhi: Primus Books. P. 370–402.
Peirce, Charlse Sanders	Semiotics	Peirce, C. S. (1991). *Peirce on signs: Writings on semiotic.* UNC Press Books.
Penrose, Roger	Cyclical conformal cosmology	Penrose, R. (2006, June). Before the big bang: an outrageous new perspective and its implications for particle physics. In *Proceedings of EPAC (pp. 2759-2763).*
Peterson, Nikolaj	Triadic idealism	Petersen, N. (2022, October 8). *Triadic idealism: A model for the fundamental nature of reality* [advanced] |

		Cosmopsychism | #PACE1. YouTube. Retrieved January 15, 2023, from https://www.youtube.com/watch?v=0z Mjn_f_1Oo
Pettersson, Max	Categories/levels of phenomena	Pettersson, M. (1996). *Complexity and evolution.* Cambridge: Cambridge University Press.
Philon, Herennius	Likely the first true thesaurus	Herennius, P. (1st Century). *On synonyms.*
Piaget, Jean	Genetic epistemology, developmental psychology, cognitive structures	Piaget, J. (1926). *The language and thought of the child.* Routledge. Piaget, J. (1970). *The principles of genetic epistemology (Vol. 7).* Psychology Press. Piaget, J. (1977). *The development of thought: Equilibration of cognitive structures.* (Rosin, A., trans.). Viking.
Plato	Eternally real forms	Hackforth, R. (Ed.). (1972). *Plato's Phaedo.* Cambridge University Press.
Popper, Karl	Three worlds of natural science, mental states and processes, and products thereof	Popper, Karl R. (1980). Three Worlds. In *The Tanner lectures on human values* (McMurrin, S., ed.). Salt Lake City: University of Utah Press, pp. 141–167.
Poundstone, William	Recursive universe	Poundstone, W. (2013). *The recursive universe: cosmic complexity and the limits of scientific knowledge.* Courier Corporation.
Reiser, Oliver	Unified symbolism	Reiser, O.L. (1955). *Unified symbolism for world understanding in science.*
Rescher, Nicholas	Properties of theories of everything	Rescher, N. (2000). The price of an ultimate theory. *Philosophia naturalis, 37*(1), 1-20.
Reynolds, Eric	Transdisciplinary organizations	Reynolds, E. M. (2019). *Next-Stage Organizations: A Transdisciplinary Case Study* (Doctoral dissertation, Saybrook University).
Richardson, Ernest	Classification of things in reality	Richardson, Ernest C. 1901. *Classification: Theoretical and Practical.* New York: Scribner.

Richmond, Phyllis	Mentefacts (scopes of observation)	Richmond, Phyllis A. 1965. Contribution toward a new generalized theory of classification. In *Proceedings of the 2nd International Study Conference on Classification Research* (Atherton, P., ed.). Copenhagen: Munksgaard, 39–54.
Roget, Peter Mark	Thesaurus revival	Roget, P. M. (1911). *Roget's Thesaurus of English Words and Phrases*. TY Crowell Company.
Rolston, Holms	Matter-Energy, Life, Mind	Rolston III, H. (2010). *Three big bangs: Matter-energy, life, mind*. Columbia University Press.
Ross, Sara	Fractal transition dynamics	Ross, S. N. (2008). Fractal transition steps to fractal stages: The dynamics of evolution, II. *World Futures, 64*(5-7), 361-374. Ross, S. N. (2014). Fractal model of nonlinear hierarchical complexity: Measuring transition dynamics as fractals of themselves. *Behavioral Development Bulletin, 19*(3), 28.
Rovelli, Carlo	Relational quantum mechanics, loop quantum gravity	Rovelli, C. (1996). Relational quantum mechanics. *International Journal of Theoretical Physics, 35*(8), 1637-1678. Rovelli, Carlo (August 2008). Loop quantum gravity. *Living Reviews in Relativity. 11* (1).
Rowe, Stan	Levels of integration and ecology	Rowe, J. Stan. 1961. The level-of-integration concept and ecology. *Ecology 42* (2): 420–27.
Sahlins, Marshall & Service, Elman	Stages of social systems	Sahlins, M. D., Service, E. R. (1988/1960). *Evolution and Culture*. Ann Arbor: The University of Michigan Press.
Salthe, Stanley	Hierarchy theory for levels of reality	Salthe, S. N. (1991). Two forms of hierarchy theory in western discourses. *International Journal Of General System, 18*(3), 251-264. Salthe, S. N. (2009). A hierarchical framework for levels of reality:

		Understanding through representation. *Axiomathes, 19*(1), 87-99.
Schofield, James	Phenomenological ontology	Schofield, J. (2021). *A Phenomenological Revision of EE Harris's Dialectical Holism.* Springer International Publishing. Schofield, J. (2022). Towards a Phenomenological Ontology: Synthetic A Priori Reasoning and the Cosmological Anthropic Principle. *The Journal of Mind and Behavior, 43*(1), 1-24.
Sebeok, Thomas	Global semiotics	Sebeok, T. A. (2001b). *Global semiotics.* Indiana University Press.
Selman, Robert	Categories/levels of interpersonal understanding	Selman, R. L. (1980). *The growth of interpersonal understanding: Developmental and clinical analyses.* Academy Press.
Shanahan, Murray	Singularity	Shanahan, M. (2015). *The technological singularity.* MIT press.
Shostak, Seth & Gardner, James	Biocosm	Shostak, S. Gardner, J. (2003). *Biocosm.* Inner Ocean Publishing
Schelling, Friedrich	Scales of organization	Von Schelling, F. W. J. (1993/1800). *System of transcendental idealism.* University of Virginia Press.
Schluchter, Wolfgang	Categories of ethics and law	Schluchter, W. (1985). *The rise of Western rationalism: Max Weber's developmental history.* Univ of California Press.
Schneider, Michael	Mathematical archetypes	Schneider, M. S. (1994). *A beginner's guide to constructing the universe: The mathematical archetypes of nature, art, and science.* HarperPerennial.
Schumacher, Ernst Friedrich	Levels of being	Schumacher, E. F. (1995). *A Guide for the Perplexed.* Random House.
Short, Tim	Simulation theory	Short, T. (2015). *Simulation Theory: A psychological and philosophical*

		consideration. Psychology Press.
Smith, Huston	Selfhood and the great chain of being	Smith, H. (1976). *Forgotten truth*. New York: Harper One.
Smolin, Lee	Self-organizing universe	Smolin, L. (1998). *The life of the cosmos*. Oxford University Press, USA.
Spencer, Herbert	Categories of phenomena	Spencer, H. (1915/1862). *A system of synthetic philosophy, Vol. 1: First Principles*. London: Williams & Norgate. Spencer, H. (1873). *A system of synthetic philosophy, Vol. 4: The Principles of Psychology, Vol. 1*. New York: Appleton. Spencer, H. (1883). *A system of synthetic philosophy, Vol. 6: The Principles of Sociology*. New York: Appleton.
Steward, Julian	Stages of cultural development	Steward, Julian H. 1972. *Theory of cultural change: The methodology of multilinear evolution*. Urbana, Chicago: University of Illinois Press.
Storm, Joseph	Metamodernity	Storm, J. A. J. (2021). *Metamodernism: The future of theory*. University of Chicago Press.
Talbot, Michael	Holographic universe	Talbot, M. (2021). *The holographic universe: The revolutionary theory of reality*. Dreamscape Media, LLC.
Tarski, Alfred	Undefinability theorem, elementary axioms	Tarski, A. (1936). *The concept of truth in formalized languages.* Tarski, A. (1959). What is elementary geometry?. *In Studies in Logic and the Foundations of Mathematics, Vol. 27*, pp. 16-29). Elsevier.
Teilhard de Chardin, Pierre	Teleology, omega point	Teilhard de Chardin, Pierre (2008/1955). *The Phenomenon of Man.* Harper Perennial Modern Classics.
Theroux, Steven	Big history	Theroux, S. J. (2023). *A Most Improbable Story: The Evolution of the Universe, Life, and Humankind.*
Tomlinson, Helen	Categories/levels of physical, chemical, artefacts, biological	Tomlinson, Helen. (1969). Problems arising from first CRG papers. In *Classification and information control: Papers*

	entities, humans, and mentefacts	*representing the work of the classification research group during 1960-1968, edited by Classification Research Group.* London: The Library Association, 73–80. Tomlinson, Helen. (1969). Report on work for New General Classification Scheme. In *Classification and information Control: Papers representing the work of the classification research group during 1960-1968, edited by Classification Research Group.* London: The Library Association, 29–41.
Torbert, Bill	Categories/levels of action logic	Torbert, W. R. (2004). *Action inquiry: The secret of timely and transforming leadership.* Berrett-Koehler Publishers.
Turiel, Elliot	Categories/levels of social-conventional concepts	Turiel, E. (1983). *The development of social knowledge: Morality and convention.* Cambridge University Press.
Turing, Alan	Universal computability	Turing, A. (1937). Computability and λ-Definability. The *Journal of Symbolic Logic, 2*(4). Turing. A. (1937). On computable numbers, with an application to the Entscheidungsproblem. *Proceedings of the London Mathematical Society, 42*(2). Turing, A. (2012/1938). *System of logic based on ordinals.* New Jersey: Princeton University Press.
Unknown author	Bhavacakra (wheel of life) as a map of the cycle of existence	Tatelman, J. (Ed.). (2005). *The Heavenly Exploits, Vol. 1.* NYU Press.
Unknown author	Metaforma	Unknown author. (n.d.). *Metaforma* [Nexumorphic]. Retrieved January 15, 2023, from https://www.nexumorphic.com/metaforma
Varga, Daniel	Jumping continuity theory	Varga, D. (2022, October 6). *Jumping continuity theory - #PACE1.* YouTube. Retrieved January 15, 2023, from

		https://www.youtube.com/watch?v=ER R82MePb4g
Velaro, Valerio	Recursive ontology	Velardo, V. (2016). Recursive ontology: a systemic theory of reality. *Axiomathes, 26*(1), 89-114.
Vickery, Brian	Categories/levels of science	Vickery, B. C. (1958). *Classification and indexing in science.* London: Butterworth. Vickery, B. C. (2005). The material mind. *Brian Vickery at home, 2005-2009.*
Vikoulov, Alex & Tuynman, Antonin	Simulation theory, singularity	Vikoulov, A. M., Tuynman, A. (2019). *The ouroboros code: Reality's digital alchemy self-simulation bridging science and spirituality.* Ecstadelic Media Group.
Vygotsky, Lev	Concept formation	Vygotsky, L. S. (1986/1934). *Thought and language.* Massachusetts: MIT Press.
Wallis, John	Mathis Univeralis (a universal mathematical science)	Wallis, J. (1657). *Operum mathematicorum pars prima.*
Weinstein, Eric	Geometric Unity	Weinstein, E. (2021). *Geometric unity: Author's working draft, v 1.0.* (Unpublished manuscript)
Wheeler, William	Categories/levels of phenomena	Wheeler, W. M. (1928). *Emergent evolution and the development of societies.* New York: Norton.
Whitehead, Alfred North	Universal algebra, process theory	Whitehead, A. N. (1898). *A treatise on universal algebra: with applications, Vol. 1.* The University Press. Whitehead, A. N. (1925). *Science and the modern world.* Macmillan. Whitehead, A. N. (2010). *Process and reality.* Simon and Schuster.
Wiener, Norbert	Circular/recursive feedback systems	Wiener, N. (1948). *Cybernetics or control and communication in the animal and the machine.* Technology Press.
Wilber, Ken	Integral theory: Great chain of being, AQAL (All	Wilber, K., Engler, J., & Brown, D. (1986). *Transformations of consciousness:*

	quadrants, all levels), fulcrums, holons	*Conventional and contemplative perspectives on development.* Boston: Shambhala. Wilber, K. (1993). The great chain of being. Journal of *Humanistic Psychology, 33*(3), 52-65. Wilber, K. (2000). *Integral psychology: Consciousness, spirit, psychology, therapy.* Shambhala Publications. Wilber, K. (2000). *Sex, Ecology, Spirituality: The Spirit of Evolution, 2nd ed.* Boston: Shambhala. Wilber, K. (2001). *A theory of everything: An integral vision for business, politics, science and spirituality.* Shambhala publications. Wilber, K. (2007). *Integral spirituality: A startling new role for religion in the modern and postmodern world.* Shambhala Publications.
Wilson, Edward	Unification of knowledge	Wilson, E. O. (1999). *Consilience: The unity of knowledge.* Vintage; Reprint edition
Witten, Edward	M-theory	Witten, Edward (1989). Quantum field theory and the Jones polynomial. Communications in Mathematical *Physics. 121 (3)*: 351–399. Witten, E. (1995). String theory dynamics in various dimensions. *Nuclear Physics B, 443*(1-2), 85-126. Witten, E. (2009). *Geometric Langlands from six dimensions.* arXiv preprint arXiv:0905.2720. Witten, E. (2011). Fivebranes and knots. *Quantum Topology, 3*(1), 1-137.
Wolfram, Stephen	Computational universe	Wolfram, S. (2002). *A new kind of science.* Wolfram Media.
Wright, Fionn	Universification	Wright, F. (2022). *Universifying: A theory, model & practice to birth our emerging world through the meta-crisis.* (Master's thesis, Antioch University).

Yao, Yiyu	Categories/levels of information processing	Yao, Y. (2009). Integrative levels of granularity. In *Human-centric information processing through granular modeling (pp. 31-47)*. Springer, Berlin, Heidelberg.
Young, Gerald	Stages and transitions	Young, G. (2011). *Development and casualty.* Springer.
Zermelo, Ernst	Set theory	Zermelo, E. (1908), Investigations on the foundations of set theory I. *Mathematical Annals, 65*(2): 261-281