A Deep Dive into Beliefs, Schemata, Tropes and Culture

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Introduction

Human understanding is shaped by the frameworks we use to organise and interpret information, known as schemata, and by the shared cultural patterns that emerge from these frameworks, called tropes. These cognitive and cultural structures play pivotal roles in shaping individual thought, collective behaviour, and societal evolution. While schemata operate at the level of individual cognition, tropes reflect shared understandings that guide societal norms, beliefs, and practices. Together, they influence everything from personal decision-making to the grand arc of cultural change.

This article explores the dynamic interplay between schemata and tropes, situating them within the Modified Morphogenetic Cycle, a framework inspired by the work of sociologist Margaret Archer. It examines how environmental, social, and cognitive factors contribute to the formation, propagation, and transformation of these frameworks, emphasising their role in both stability and change within societies.

The discussion begins by tracing the origins and properties of information, i.e., the building blocks of schemata and tropes, before delving into the processes of belief formation and schema development. The article also considers the impact of subconscious schemata on behaviour and the discomfort of cognitive dissonance when conflicting frameworks arise. Finally, it highlights the practical implications of these concepts for interdisciplinary collaboration, problem-solving, and cultural evolution, offering insights into how shared frameworks can bridge divides and foster innovation.

By linking foundational theories with contemporary research, this article aims to provide a comprehensive understanding of how schemata and tropes shape human experience, guiding individual and collective responses to an ever-changing world.

The Modified Morphogenetic Cycle

The Original Morphogenetic Cycle

The Morphogenetic Cycle was described by the British sociologist Margaret Archer (1943 – 2023)(Archer, 1982). The original cycle describes the relationship between the structure of society, its culture, and agency (the ability to choose among options and to act). The cycle takes the form of a continuously operating feedback loop in which there are time delays. Society gives agents roles. These roles define its structure. That is, the relationships between individuals that create groups, organisations, etc. Society also makes cultural demands of agents. These include values (what is held to be good or bad), norms (acceptable or unacceptable behaviour), and beliefs (what is held to be true or false). In turn, agents either accept or reject these roles and cultural demands. Agents automatically affirm those that they accept. However, if they do not, they engage in reflexivity or introspection to identify alternatives. They then promote those alternatives into society which may alter its culture or structure. For example, the promotion of

womens' rights is altering Western cultural values and leaving an unsatisfactory job alters society's structure.

Modification for the Natural Environment

One significant omission from the original cycle is human impact on the natural environment and vice versa. This article introduces an original modification to the Morphogenetic Cycle by explicitly incorporating the natural environment as a co-evolving component. Particularly in the early stages of human development, the natural environment played a profound role in shaping human culture by influencing subsistence strategies, social structures, and belief systems. More recently, with population growth and urbanisation, although the environment remains a significant factor in human wellbeing, the focus has become the social environment.

Interaction with the environment also takes the form of a continuously ongoing feedback loop with time delays. Prominent anthropologists like Julian Steward developed the concept of cultural ecology, which explores how cultures adapt to their physical environments. Steward's work highlights the significance of the environment as a factor in cultural development, while critics emphasise the need to also consider historical, social, and individual agency.

Factors such as climate, geography, and resource availability directly impact how communities organise themselves and interact with their surroundings. For example, agricultural societies often emerge in fertile regions with predictable rainfall, fostering settled lifestyles, hierarchical structures, and collective labour practices. Conversely, nomadic cultures often develop in arid or resource-scarce environments, emphasising mobility, adaptability, and egalitarian social systems. In turn, these human activities modify the environment. If an agent is satisfied by the environmental impacts, e.g., adequate food, then they will automatically endorse society's activities. However, if not, they will engage in reflexivity to identify more acceptable forms of social behaviour and will attempt to propagate them. Cultural adaptations, such as irrigation systems or architectural styles, reflect such responses to environmental challenges, demonstrating the dynamic relationship between nature and society.

Numerous authors have written on this topic, most notably (Steward, 1955),(Diamond, 1997 & 2005), (Marx, 1857/1939), (Engels, 1845),(Braudel, 1949),(Toynbee, 1934–1961),(Rappaport, 1968),(Beck, 1992),(Vidal de la Blache, 1926),(Mumford, 1961) & (Ingold, 2000).

The Morphogenetic Cycle modified to include the natural environment is described graphically in Figure 1. In this diagram:

- Enculturation means the transfer of society's values, norms and beliefs to the agent. These may or may not be internalised, i.e., made the agent's own.
- Reflexivity means the agent's contemplation of the impact of society and the environment on him and potential alternatives.
- The term enculturement is a neologism describing the propagation of an agent's reflexive conclusions into society.
- Automaticity, on the other hand, is the acceptance of those impacts without necessarily engaging in conscious thought.

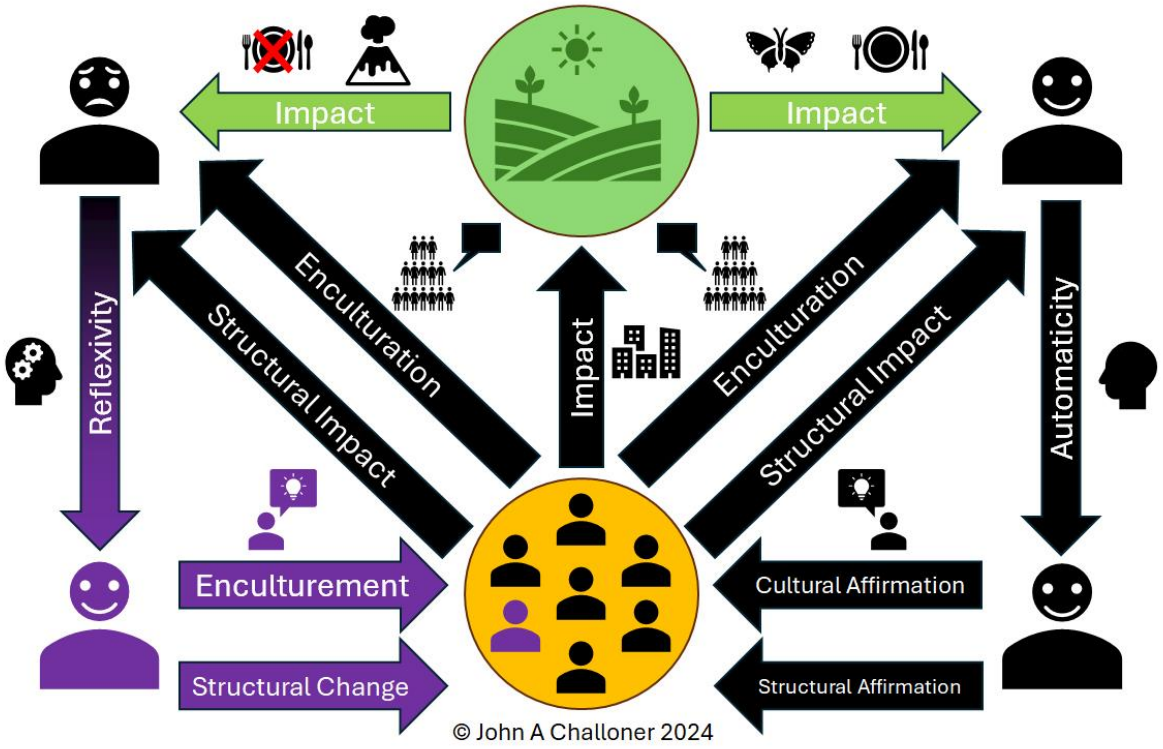

Figure 1. The Morphogenetic Cycle Modified to Include the Natural Environment

Further Modification for Agent Groups

This article further enhances the Morphogenetic Cycle by introducing the concept of group agency. That is, agents in the cycle are not only individuals, but can also be groups of individuals with common values, norms, and beliefs operating together. Similarly, society can be any parent group operating in the same way. Agency, when defined in this way, is layered in the form of a nested hierarchy, i.e., individual agency, family agency, social group agency, organisational agency, national agency, and general human agency. Thus, the Morphogenetic Cycle becomes layered in the form of a nested hierarchy with feedback loops continuously ongoing at all levels.

Again, whilst not specifically modifying the morphogenetic cycle, several authors have written on this topic, notably (Bhaskar, 1979), (Archer, 1988), (Archer, 1995), (Mouzelis, 1995), (Archer, 2000), (Elder-Vass, 2010) & (Elder-Vass, 2012).

Parallel with Multi-level Selection Theory

The layering of agency in the form of a nested hierarchy of groups, has strong parallels with multi-level selection theory. The two concepts are therefore mutually supportive. Multilevel selection theory, strongly advocated by E.O. Wilson in his later work (Wilson & Wilson, 2007) and developed mathematically by David Sloan Wilson (Wilson, D. S., 1975), proposes that natural selection operates not only at the level of individuals and genes but also at the level of groups. It explains how cooperative behaviours can evolve when they enhance the survival and reproductive success of the group, even if such traits might reduce the fitness of individual members. Groups with greater cooperation and social cohesion often outcompete less cooperative groups, indirectly benefiting the genomes of individual members through group survival.

Multilevel selection theory sheds light on the evolutionary advantages of group cooperation, demonstrating how traits that promote altruism, social bonding, and group stability can ultimately enhance the genetic fitness of individuals within cooperative groups.

However, a notable opponent of multilevel selection theory is evolutionary biologist Richard Dawkins, who emphasises the gene as the primary unit of selection, as articulated in his book *The Selfish Gene*. (Dawkins, 1976). Dawkins argues that phenomena like cooperation are better explained by kin selection or reciprocal altruism rather than by group selection.

Understanding the Further Modified Morphogenetic Cycle

This nested hierarchy of groups introduces considerable complexity into the Morphogenetic Cycle. Central to understanding it is an understanding of information, shared schemata, tropes and culture. This article will build this understanding from the ground up, beginning with the nature of information, then explaining beliefs, schemata, tropes and culture in that order.

Information

The ability to hold and manipulate information is a feature of life and some of its artifacts, e.g., computers and smartphones. The theoretical biologist, biophysicist, and systems theorist, Robert Rosen (1934–1998), framed this ability in terms of anticipation. (Rosen,1985). Anticipation is a feature of the ability to manipulate information, and expresses itself in the form of causal relationships. In non-living things, a cause that is possible, i.e., an anticipated event, cannot lead to an effect that is certain, whilst in living things, it can. For example, it would be incorrect to say that "A rock may fall. So, it will hold tight". However, it is correct to say that "The mountaineer may fall. So, he will hold tight." Clearly, this ability has an evolutionary effect.

Beliefs, schemata, tropes and culture are all forms of information. Although the groundwork was prepared by Ludwig Boltzmann in the 19th Century and Claude Shannon in the 20th Century, the German-American Physicist, Rolf Landauer (1927 – 1999), was the first to crystallise the concept that information is physical in nature. (Landauer, 1961). That is, information, and thus, beliefs, schemata, tropes and culture, take the form of organisation in matter and energy, and so, must have a place or places of residence in the physical universe.

This physical nature applies even to seemingly abstract concepts. The concept of "Justice", for example, illustrates how abstract concepts are in fact real. Justice comprises several just acts, each concrete, observable, and specific, such as a fair trial, an equitable policy, or an honest decision. No individual can witness the entirety of justice in a single moment because it spans countless acts over time and across contexts. This limitation of perception gives justice its abstract quality. Thus, justice is not only an idea but a physical reality.

Information also has the following properties. These properties have been recognised throughout much of human history, but were formalised in the 20th Century by several researchers, most notably Alan Turing, Norbert Wiener and Claude Shannon.

- Information is reproducible. That is, it can be copied or duplicated accurately across mediums or systems without loss or alteration. Alan Turing demonstrated the theoretical basis for reproducibility through the concept of a universal Turing machine (Turing, 1936).

- It is translatable. That is, it can be expressed or encoded in a different format, language, or system while preserving its meaning or function. Through cybernetics, Norbert Wiener connected information to feedback and control, essential for transmission and reproduction in systems (Wiener, 1948).
- It is transmissible. That is, it can be sent or conveyed from one location, medium, or system to another, potentially across distances or time. Claude Shannon formalised the principles of transmissibility and error correction (Shannon, 1948).

These properties mean that information can take two forms:

- information at source, i.e., organised matter or energy as it originally exists in the natural world; and
- reproduced, translated and transmitted information.

The latter includes beliefs, schemata, and tropes. These forms of information are regarded as true if they accurately reflect information at source. However, errors are frequently introduced during reproduction, translation and transmission, so that they become false.

Beliefs

A belief is a mental representation or cognitive state in which an individual holds a proposition, concept, or idea to be true or probably true, and which may guide thought and behaviour.

Beliefs can be acquired in two main ways. The first is through empirical means, such as direct observation of reality. As described in Figure 3, reality includes not only our physical and natural environment, but also our social one. The latter includes individual and group agents, their structural relationships, their culture, and the information they hold. Information acquired in this way is most likely to be true.

However, information gained empirically can be distorted by biological and cognitive influences, such as:

- sensory limitations;
- perceptual biases;
- memory distortions;
- confirmation bias;
- oversimplifying heuristics; and
- emotional or motivational factors.

This is particularly the case when observing society. Increasingly a second-order cybernetic approach is being used to address this. That is the researcher is included in the social system being observed, and his biases taken into account. For example, there is increasing emphasis on researchers engaging in reflexivity to uncover their biases.

Notable authors on this topic are (Tversky & Kahneman, 1974), (Schacter, 1999), (Von Foerster, 2003), (Maturana & Varela, 1980), (Finlay, 2002), (Alvesson & Sköldberg, 2017), (Bourdieu, 1990) & (Haraway, 1988).

Beliefs can also be acquired socially through mechanisms like socialisation, where societal approval or disapproval reinforces conforming behaviour (Durkheim, 1922), and social learning, where individuals emulate role models, (Bandura, 1977). Because such beliefs have been highly

processed, i.e., have been the subject of many translations, transmissions, and biological and cognitive influences, they are less likely to be true.

Schemata

Origin and Description

The concept of schemata (plural of schema) was first introduced by the German philosopher, Immanuel Kant (1724 - 1804), (Kant, 1781/7). In the 20th Century, the British psychologist, Frederic Bartlett (1886 – 1969), introduced the concept to the field of psychology, emphasising the role of schemata in memory (Bartlett, 1932).

A schema is a cognitive framework or mental structure that organises and interprets information, allowing individuals to process experience, make predictions, and guide behaviour efficiently. Schemata are assembled cognitively within individuals. This process often occurs subconsciously, integrating components such as beliefs, practices, language, and social norms. Beliefs are among the components that form and modify schemata. However, schemata also generate beliefs. This relationship is described diagrammatically in Figure 3. Because schemata are abstract and subconscious, their influence can feel self-evident, natural and intuitive, shaping beliefs and actions without conscious recognition. For example, societal norms and daily routines reinforce schemata, making them appear self-evident.

How schemata change over time

Schemata are not static. Bartlett noted that they are dynamic and flexible systems that adapt through assimilation (integrating new information) and accommodation (modifying existing frameworks) to accommodate changing knowledge and experiences. For example, exposure to diverse perspectives or global media can challenge existing schemata, leading to their modification or expansion. In his famous “War of the Ghosts” experiment, Bartlett had participants read and recall a Native American folk story. He observed that over time, participants' recollections became shorter and more aligned with their cultural expectations, reflecting changes in their schemata (Bartlett, 1932).

Bartlett’s work laid the foundation for modern cognitive psychology and remains influential in understanding learning, storytelling, and even artificial intelligence.

The Role of Sleep

Emerging research suggests that the assembly and revision of schemata may occur significantly during sleep, when the mind consolidates and reorganises information. Studies on memory consolidation indicate that sleep enhances the integration of new knowledge with existing frameworks, forming coherent schemata. (Lewis & Durrant, 2011)(Durrant, Cairney, & Lewis, 2015)(Hennies et al., 2016)

Intransmissibility of Schemata/ How schemata propagate

The abstract nature of schemata also defies straightforward verbal description. They are often best expressed through stories, art, or rituals, which encapsulate complex shared meanings in tangible forms. Thus, they are not transmitted directly from one individual to another. Rather their component beliefs behaviours etc. are transmitted and reassembled by recipients into a schema of their own. Research in the fields of cognitive anthropology and memetics has shown

that knowledge is rarely transmitted as a complete package. Instead, individuals receive fragments (e.g., myths, traditions) and synthesise them into coherent frameworks based on their cognitive and cultural backgrounds.

Notable work on this concept has been carried out by (Quinn & Holland, 1987), (Bloch, 1991), (Whitehouse, 2004), (Blackmore, 1999) & (Sperber, 1996).

The Recognition of Schemata

The subconscious nature of schemata has both enabling and constraining effects. On one hand, it constrains agency by limiting an individual's ability to think outside their framework. On the other hand, when individuals become conscious of schemata, they can use this awareness to challenge and reshape them. Despite their subconscious nature, schemata can become visible when consciously examined or named. This often happens when individuals encounter conflicting beliefs or alternative perspectives, prompting critical reflection.

Schema therapy, developed by Dr. Jeffrey Young in the 1990s, is a transformative approach that helps individuals recognise and modify deep-seated schemata. Often formed in early life, they can become maladaptive, leading to recurring patterns of distress or dysfunction. By fostering awareness of these underlying frameworks, schema therapy empowers individuals to break free from harmful cognitive and behavioural cycles and replace them with healthier, more adaptive ones. (Young, Klosko, & Weishaar, 2003).

Cognitive Dissonance

The concept of cognitive dissonance originated with the American social psychologist, Leon Festinger (Festinger, 1957).

Cognitive dissonance, the mental discomfort experienced when holding conflicting beliefs, is a well-documented psychological phenomenon. For example, if a person believes smoking is harmful but continues to smoke, they may experience dissonance. To resolve this, they might quit smoking, downplay the health risks, or rationalise their habit as stress relief.

Traditionally, cognitive dissonance has been understood to arise from contradictions between conscious beliefs. However, this article introduces an original extension to the concept, suggesting that cognitive dissonance can also stem from conflicts between subconscious schemata and conscious beliefs, or between two subconscious schemata. To the best of my knowledge, this perspective has not been explicitly addressed in existing literature, representing a novel contribution to the theory. (Chinn & Brewer, 1993)(Piaget, 1985)(Vosniadou & Brewer, 1992)

This extension builds upon Leon Festinger's foundational work on cognitive dissonance by incorporating the role of subconscious frameworks, offering a more comprehensive understanding of the phenomenon. When conscious beliefs clash with subconscious schemata, or when two subconscious schemata conflict, individuals may experience dissonance without being able to articulate its source. For example, someone raised with a schema of individualism might experience discomfort when confronted with collectivist ideologies, even if they cannot immediately explain the conflict.

Effort after Meaning and Schema Change

Clearly, cognitive dissonance is an unpleasant experience that we would prefer to avoid. One way of doing so is "effort after meaning". This concept was also introduced by Frederic Bartlett (Bartlett, 1932), and revolutionised how we understand memory. Bartlett proposed that memory is not a passive, exact reproduction of past events but an active and constructive process. When individuals remember information, they do so by reconstructing it, often guided by their existing knowledge, cultural influences, and expectations.

When faced with unfamiliar or ambiguous information, people engage in an effort after meaning, striving to fit the new information into pre-existing schemata or creating new ones to make sense of it. This active process allows individuals to derive meaning, but can also introduce distortions or omissions as details are unconsciously modified to align with familiar patterns of thought.

A schema that is entirely consistent with reality must, by its nature, be internally consistent, as its components reflect a coherent and accurate representation of the external world. However, when one component belief or element of a schema deviates from reality, the schema must adapt to accommodate this distortion. This process often leads to the distortion of related elements within the schema to maintain internal coherence. These adjustments can propagate inaccuracies, creating a ripple effect that skews the schema further from reality.

This effect was also demonstrated by Bartlett's "War of the Ghosts" experiment. He found that when participants were asked to recall the Native American folktale, details that did not align with the participants' cultural understanding were changed or omitted, and the story was reshaped to fit more familiar narratives.

However, over time, these schemata may also face anomalies, ideas, experiences, or beliefs that conflict with the established subconscious framework. They may, therefore, adapt, hybridise, or even be replaced by entirely new frameworks in response to these tensions.

An example of schema change can be observed in the gradual rejection of a religion in which one was raised. Schemas, as mental frameworks that organise our understanding of the world, are deeply ingrained when tied to a religious upbringing. They encompass beliefs, rituals, moral values, and explanations about life and the universe, offering a sense of stability, identity, and purpose. When new information or experiences challenge these schemas, individuals often experience cognitive dissonance, a state of mental discomfort arising from the conflict between their existing schema and contradictory evidence.

Initially, individuals may try to assimilate the new information into their existing schema by reinterpreting it to fit their beliefs. For example, they might reinterpret religious texts metaphorically to reconcile them with scientific discoveries or philosophical questions. However, as discrepancies accumulate and assimilation proves untenable, the schema begins to destabilise. This may lead to a transitional phase of hybridisation, where the old framework and new insights coexist uneasily. An individual might, for instance, retain a sense of spirituality while moving away from organised religious dogma or explore alternative interpretations of their faith.

Over time, this process often shifts toward accommodation, where the schema undergoes significant modification to incorporate the new information. In some cases, accommodation results in the complete rejection of the religious framework and the development of an entirely

new schema. This new worldview might focus on secularism, personal spirituality, or existential philosophy, providing a fresh way to understand and navigate the world.

The emotional journey accompanying this transformation can resemble the stages of grief: denial, anger, bargaining, depression, and ultimately, acceptance. Losing a religious schema involves more than just cognitive change; it often entails a profound emotional and social upheaval, including the loss of community and a sense of meaning. This illustrates the depth of resistance and complexity involved in changing deeply held schemas, particularly those tied to identity. Such changes are not only cognitive shifts but also emotional and existential transformations, demonstrating the intricate interplay between belief, evidence, and human experience.

Paradigm Shifts

Bartlett's effort after meaning, among other factors, provides an explanation for the resistance of schemata to change. However, ultimately, they do change when sufficient evidence accumulates. This process closely parallels that of the paradigm shift.

Thomas Kuhn's influential theory of paradigm shifts, outlined in *The Structure of Scientific Revolutions* (1962), (Kuhn, 1962) offers an insight into how scientific understanding evolves. According to Kuhn, scientific progress is not a steady accumulation of knowledge but occurs through revolutionary shifts in the fundamental frameworks, or paradigms, that guide scientific inquiry. A paradigm encompasses the shared beliefs, methods, and standards of a scientific community, shaping how problems are defined and solved.

During periods of "normal science," researchers operate within an established paradigm, solving puzzles and refining theories. However, over time, anomalies, observations or results that cannot be explained within the existing framework, begin to accumulate. Initially, these anomalies are addressed by stretching or modifying the paradigm, but as they grow more significant, they lead to a period of crisis. This crisis prompts the emergence of a new paradigm offering a fundamentally different way of understanding the phenomena, leading to a revolutionary shift. Examples include the transition from Newtonian mechanics to Einstein's relativity or from Ptolemaic or geocentric to Copernican or heliocentric astronomy. These shifts are not merely adjustments; they represent a profound transformation in how the scientific community perceives the world.

The principal difference between schemata and paradigms is that, whilst the former are subconscious, the latter are consciously recognised frameworks. However, both involve frameworks that guide thought and meaning, both face resistance to change from adherents, both face challenges from anomalies, and both undergo transformative change when these challenges can no longer be resolved. This suggests that the processes governing scientific revolutions, subconscious shifts and social shifts are not entirely distinct.

Recognising these similarities offers a deeper understanding of how humans and societies adapt to new information, both consciously and subconsciously.

The following references offer valuable insights into the cognitive restructuring and emotional journeys individuals undergo during significant changes in their religious beliefs: (Festinger et al., 1956),(Scobie, 1973),(Berger, 2008),(Rambo, 1993),(White, 1992),(Schellenberg, 2013) & (Rambo et al. (Eds.), 2014).

Interdisciplinary Connections

An understanding of the role of schemata can be of practical value in making cross-disciplinary connections (Zhang & Zhang, 2023),(Frödin, 2017), (Rumelhart,1981),(Davis, 2022). Different disciplines often use distinct language to describe similar concepts, creating barriers to cross-disciplinary understanding. Schemata, due to their abstract nature, transcend such linguistic and contextual differences. By tapping into these overarching cognitive frameworks, we can uncover connections that might otherwise remain hidden. For instance, we may encounter a specific belief or explanation and subconsciously link it to a broader schema. This, in turn, helps us to access related ideas and interpretations, often without conscious awareness. Research suggests that such integrative processes might even occur during sleep, as our minds consolidate and reorganise information. By recognising and leveraging schemata, both subconsciously and deliberately, we can navigate interdisciplinary divides and foster innovative insights.

In particular, this approach can, in part at least, help to overcome the difficulties of second order cybernetics (defined below) in the social sciences by drawing parallels from other disciplines. This is because the same biases that apply when considering human affairs may not apply in other disciplines.

Second-order cybernetics is the study of systems that include the observer as an integral part of the system being observed. Unlike first-order cybernetics, which focuses on the behaviour of systems from an external perspective, second-order cybernetics examines how the observer's interactions, interpretations, and participation influence the system. It emphasises reflexivity, self-reference, and the role of feedback loops in shaping both the system and the observer's understanding of it.

This approach is often associated with the work of Heinz von Foerster and applies to fields such as sociology, psychology, and epistemology, where the observer cannot be separated from the system being studied (von Foerster, 2003).

Problem Solving

Schemata play a vital role in problem-solving by providing cognitive frameworks that help individuals organise information and generate solutions. When confronted with a problem, the mind subconsciously associates it with a relevant schema. This association enables individuals to draw on related ideas and patterns within the schema, facilitating the problem-solving process.

This creative process often follows the stages of saturation, incubation, inspiration, and verification, as outlined by Graham Wallas (Wallas, 1926). The first three stages were initially identified by the German physicist Hermann Helmholtz during a speech in 1896. In the saturation stage, individuals immerse themselves in the problem, gathering information and exploring potential solutions. Cognitive psychology suggests that schemata are particularly valuable at this stage, as they help organise complex information and identify patterns that can guide problem-solving efforts.

The incubation stage involves subconscious processing, during which the mind continues to work on the problem without active, conscious effort. Research on memory consolidation during sleep highlights how schemata are activated and modified during this phase, allowing

information to be reorganised and novel connections to emerge. This process often leads to the inspiration stage, the "Eureka!" moment when elements of the problem align with the schema, producing a potential solution. Finally, the verification stage, added by Wallas, involves testing and refining the solution to ensure it aligns with the original problem and fits within the broader schema.

Analogical reasoning is another key aspect of schema-driven problem-solving. Studies have demonstrated that individuals often solve problems by drawing parallels to similar situations, using schemata as cognitive templates to identify solutions. For instance, an engineer designing a bridge might rely on the schema of structural integrity, drawing analogies from other successful designs to address specific challenges. This ability to adapt and apply existing schemata to new contexts underscores their utility in generating innovative solutions.

The subconscious nature of schemata means much of the problem-solving process occurs outside conscious awareness, guided by implicit patterns and associations. Neuroscience research on insight highlights the role of the brain's default mode network (DMN) (Raichle et al., 2001) during moments of creative inspiration, where subconscious schemata interact with conscious thought to generate new ideas. This interplay between the subconscious and conscious mind reflects the dynamic power of schemata in navigating complex problems.

Practical applications of schema-driven problem-solving are evident in fields like design thinking and systems thinking (Brown, 2009), (Cross, 2011), (Senge, 1990), (Meadows, 2008), (Jones, 2014) & (Nelson & Stolterman, 2012). These methodologies leverage abstract frameworks to generate creative and adaptive solutions across disciplines. By intentionally engaging with schemata, individuals can enhance their ability to identify patterns, connect ideas, and innovate effectively.

Understanding the role of schemata in problem-solving reveals how deeply embedded cognitive frameworks shape our capacity to address challenges. By drawing on both subconscious and conscious processes, schemata enable individuals to navigate complexity and foster creativity and adaptability in problem-solving endeavours.

Tropes

The Nature of a Trope

Schemata can be both personal and individual, or shared across groups. When similar schemata are shared by multiple individuals, they form a trope, a higher-order construct with emergent properties (Nishida, 1999).

The term "trope" originates from literary studies, where it traditionally referred to figurative language, such as metaphors or symbols, used to convey meaning indirectly (Hawkes, 1972). Over time, the concept expanded into disciplines like philosophy, anthropology, cultural studies, and sociology, where it evolved to denote a symbolic pattern or higher-order, abstract framework that shapes how people interpret and organise their world (White, 1973). This broader use differs from the dictionary definition by emphasising tropes as generative frameworks for meaning-making, transcending their original linguistic and literary boundaries. The term no longer refers to just figures of speech but to tools that shape collective beliefs, social systems, and cultural evolution.

A trope represents the emergent whole, arising from the shared schemata held by many individuals (Capra, 1996). The relationship between a trope and its component schemata exemplifies the concept of duality in systems theory: the whole (the trope) is greater than, yet dependent on, the sum of its parts (individual shared schemata) (Checkland, 1999). Conversely, the trope influences and shapes its parts by embedding shared values, norms, and beliefs within the individual schemata. Just as a fish relates to a shoal or a bird to a flock, a shared schema relates to a trope.

Figure 2. The Relationship between Schemata, Tropes and Culture

This duality is evident in the way a trope functions. It can be described in terms of society or a group, embodying shared understandings that shape collective beliefs, practices, and norms. For example, a societal trope like "justice" encompasses institutions such as courts and legal systems, along with cultural narratives that reinforce shared conceptions of fairness and morality (Berger & Luckmann, 1966). The trope acts as a higher-level abstraction that organises and perpetuates these shared meanings.

However, the physical existence of a trope lies in the minds of the individuals within the group. Its abstract nature means that it is not directly transmitted from one person to another. Rather it is the aggregation of shared schemata across individuals. Nor are schemata themselves transferred directly. Rather, the values, norms, and beliefs that they generate are communicated and then reassembled into a shared schema by the recipient (Geertz, 1973). The interplay between these individual schemata then gives rise to the collective whole, a trope with emergent properties.

Thus, a trope operates as a dynamic system: the whole shapes the parts, while the parts collectively generate the whole. This concept is illustrated in Figure 3, which shows how shared schemata contribute to and are influenced by the emergent properties of the trope.

How Tropes Change over Time

Tropes evolve through adaptation, transformation, or hybridisation in response to environmental shifts, internal contradictions, and human agency (Brown & Westaway, 2011). This dynamic nature ensures that they remain relevant in changing societal contexts.

They can change in the following ways:

- Tropes can evolve incrementally as they are subtly reinterpreted or extended to fit new contexts (TV Tropes, n.d.). For example, the "logic of money" is adapted to encompass cryptocurrencies, retaining its core metaphor while shifting its specific applications.

- When a trope is no longer viable, it may be replaced by a fundamentally different framework. For example, the shift from the "Earth as a flat plane" trope to the "Earth as a sphere" radically transformed beliefs about geography and cosmology.
- Tropes can merge with others, creating hybrid constructs that reflect new realities. For example, the trope of "money" merges with "network" in the digital age, producing concepts like "social capital" in online platforms.

They can change due to:

- External changes, e.g., technological advancements, economic transformations, challenge the applicability of existing tropes, necessitating adaptation (Bscholarly, 2021). For example, the rise of digital currencies alters the "logic of money" trope, introducing new metaphors for value and exchange.
- Internal inconsistencies within a trope or its inability to address new challenges lead to its reinterpretation or replacement. For example, the trope of "divine right of kings" became untenable during Enlightenment-era social changes, giving way to democratic ideals.
- Individuals or groups critically reflect on or intentionally challenge tropes, often through activism, art, or intellectual movements (Psychreg, 2022). For example, Feminist critiques of the “Adam and Eve” trope have redefined gender roles in many societies.

Examples of Tropes

This section explores several key examples of tropes and their influence on societal structures and individual cognition.

The Trope of Progress

The trope of "progress" has been a driving force in many societies, particularly since the Industrial Revolution. It encapsulates the belief that human innovation and effort lead to continual improvement in living standards, knowledge, and technology. This trope underpins societal investments in science, education, and infrastructure, shaping individual aspirations and collective policies. However, the trope of progress is not without critique. It has been challenged by movements that highlight its environmental and social costs, leading to the emergence of alternative tropes, such as "sustainability" and "equity."

The Trope of Freedom

Freedom is another powerful trope that has shaped political ideologies and social movements throughout history. It reflects shared beliefs about autonomy, rights, and self-determination. In democratic societies, the trope of freedom informs governance structures, legal systems, and cultural values. However, the abstract nature of freedom allows for varied interpretations across contexts. For example, in some political frameworks, freedom emphasises individual rights, while in others, it focuses on collective liberation. This flexibility demonstrates the adaptability of tropes to different cultural and historical circumstances.

Political Ideologies as Tropes

Political ideologies are deeply rooted in tropes that shape collective beliefs about governance, society, and justice. For instance, socialism is underpinned by the trope of "equality,"

emphasising the collective redistribution of resources to reduce disparities (Piketty, 2014). In contrast, capitalism relies on the trope of "individualism," prioritising personal initiative and market freedom (Hayek, 1944). These ideological tropes are not static; they adapt to historical and cultural contexts, often intersecting with other tropes like freedom or progress. For example, contemporary discussions on social democracy blend the tropes of equality and individualism, reflecting the dynamic nature of political ideologies (Giddens, 1998).

Ethics and Moral Tropes

Ethical systems are similarly built around central tropes that guide societal values and norms. The trope of "fairness," for instance, underpins many ethical frameworks, shaping principles such as justice, equity, and reciprocity (Rawls, 1971). Religious and philosophical ethics often reflect broader societal tropes. For example, the concept of "the common good" is central to many traditions, reflecting collective values that transcend individual interests (MacIntyre, 1984). These moral tropes evolve alongside cultural and societal shifts, influencing how ethical dilemmas are framed and resolved.

The Trope of Nature

The trope of "nature" has evolved significantly over time. Traditionally, nature was often viewed as an infinite resource to be exploited for human benefit. This understanding has informed agricultural practices, industrial development, and economic policies. However, as awareness of environmental degradation has grown, this trope has shifted toward one of "sustainability" or "harmony with nature" (Meadows et al., 1972). This transformation illustrates how tropes adapt to new challenges and reflect changing societal priorities.

The Trope of Justice

Justice is a trope deeply embedded in legal systems, moral philosophies, and cultural narratives (Sen, 2009). It reflects shared beliefs about fairness, accountability, and equality. The trope of justice is embodied in institutions such as courts and legal frameworks, as well as in symbolic acts like public trials or protests. While the idea of justice is universal, its interpretation varies widely across cultures and contexts, influenced by historical, social, and political factors.

The Trope of Growth

Economic growth is another prevalent trope, particularly in capitalist societies. It embodies the belief that increasing wealth and productivity leads to societal well-being. This trope has driven policy-making and economic strategies worldwide, fostering innovation and industrial expansion. However, like the trope of progress, it has faced critique from movements advocating for degrowth or alternative economic models that prioritise well-being over material accumulation (Kallis, 2018).

Utility of Schemata and Tropes

The concept of utility, introduced by philosopher Jeremy Bentham, provides a framework for evaluating the usefulness of actions, decisions, or frameworks in maximising overall happiness or well-being (Bentham, 1789). Utility is often understood as the measure of how well an action or idea contributes to the greatest good for the greatest number. While originally developed as a moral philosophy underpinning utilitarian ethics, the concept of utility has broader applications, including the evaluation of schemata and tropes.

Schemata and tropes, as frameworks of understanding that generate behaviour, can be assessed in terms of their utility, specifically, their ability to help individuals and societies to satisfy needs, interpret experiences, solve problems, and navigate challenges (Lakoff, 1987). A schema or trope's utility lies in its capacity to provide coherence and direction in complex situations. For instance, the trope of "justice" has utility in guiding legal systems and societal norms, offering a shared foundation for resolving disputes and promoting fairness (Rawls, 1971).

The utility of a schema or trope is not static but context-dependent. A trope that is highly useful in one era or environment may lose its relevance in another (Kuhn, 1962). For example, the trope of "nature as an infinite resource" was once instrumental in driving industrial and agricultural expansion. However, as environmental degradation has become a pressing concern, this trope has been increasingly replaced by the trope of "sustainability," which has greater utility in addressing contemporary ecological challenges (Meadows et al., 1972).

Tropes also demonstrate utility in fostering social cohesion and collective action. The trope of "freedom," for example, has inspired political movements and revolutions, providing a shared framework that unites individuals around common goals (Berlin, 1969). Similarly, the trope of "progress" has motivated innovation and development, shaping collective aspirations and policies aimed at improving human well-being (Nisbet, 1980).

However, the utility of a schema or trope is not without its limitations or consequences. Tropes that once served a useful purpose can become outdated or even harmful when societal conditions change. For example, the trope of "economic growth" has driven significant advances in productivity and wealth creation but has also faced critique for prioritising material accumulation over social and environmental well-being (Kallis, 2018). Understanding the utility of tropes involves recognising not only their benefits but also their potential costs and trade-offs.

By examining tropes through the lens of utility, we gain insight into how shared frameworks contribute to societal function and adaptation. Tropes are not inherently good or bad; their value lies in their ability to address the needs and priorities of the societies that adopt them. As societal challenges evolve, so too must the tropes that guide collective understanding and action, ensuring their continued relevance and utility (Capra, 1996).

Tropes, Adaptive and Transformative Social Change

Existing tropes play a significant role in facilitating adaptive social change by providing frameworks through which societies interpret and respond to challenges (Geertz, 1973). Tropes, as subconscious cultural patterns, offer continuity and familiarity, allowing societies to develop solutions to emerging problems without fundamentally altering their structures. For instance, the trope of economic growth might guide policies to address unemployment or resource scarcity, often through incremental adjustments such as introducing new technologies or revising fiscal policies (Piketty, 2014). These solutions remain within the bounds of the established framework, making them broadly acceptable and easier to implement.

Adaptive social change, therefore, is characterised by adjustments that refine or extend existing tropes to address societal needs. This process maintains stability while promoting evolution within the current paradigm. A notable example can be seen in responses to environmental

challenges: the trope of stewardship has guided adaptive changes like recycling programs or renewable energy adoption, providing practical solutions without questioning deeper assumptions about human-nature relationships (Meadows et al., 1972).

However, when existing tropes fail to address deeper systemic problems or when anomalies accumulate, a "paradigm shift" in tropes becomes necessary, catalysing transformative social change. Transformative change involves a fundamental reorganisation of societal norms, values, and practices, akin to the paradigm shifts described in Thomas Kuhn's theory of scientific revolutions (Kuhn, 1962). In these moments, established tropes are no longer sufficient to provide meaning or solutions, prompting the emergence of new ones that radically redefine how societies understand and navigate the world.

For example, the shift from the "divine right of kings" to democratic governance represented a profound transformation in societal structures, values, and power dynamics (Tocqueville, 2000). Similarly, the ongoing transition from seeing nature as an infinite resource to recognising ecological limits reflects a paradigm shift that has spurred transformative environmental movements (Capra, 1996). These new tropes provide a radically different lens for interpreting reality and often lead to systemic changes in institutions, behaviours, and cultural narratives.

The distinction between adaptive and transformative change highlights the dual role of tropes in shaping social evolution. Existing tropes anchor societies in stability and continuity, enabling incremental progress. Paradigm shifts in tropes, on the other hand, allow societies to overcome profound crises by embracing fundamentally new ways of thinking. Together, these processes reveal the dynamic interplay between stability and transformation, offering a deeper understanding of how societies evolve over time (Giddens, 1991).

Tropes, Subcultures and Cultural Evolution

Subcultures, by their very nature, share many of the same tropes as the parent culture from which they emerge (Hebdige, 1979). These shared tropes provide a foundation of common understanding, anchoring the subculture to the broader societal framework. However, subcultures also develop distinct tropes that reflect their unique identities, values, and experiences. These distinct tropes emerge from individual schemata that align within the subculture (Gelder & Thornton, 1997). These distinct tropes often arise as reinterpretations, modifications, or even rejections of the dominant cultural tropes, allowing the subculture to navigate its particular social, geographical, or historical context.

The relationship between subcultures and their parent culture is dynamic and multifaceted. In many cases, subcultures operate within the broader cultural framework, maintaining strong connections to the dominant culture while introducing alternative perspectives. For example, artistic subcultures may challenge mainstream aesthetic values through innovation while still drawing on foundational tropes of creativity and expression shared with the parent culture (Becker, 1982). Similarly, subcultures that critique societal norms, such as youth countercultures, often frame their opposition using the language and symbols of the dominant culture, ensuring a degree of interaction and exchange.

However, when subcultures are separated from the parent culture, either geographically or socially, their trajectories can diverge significantly. Geographic separation, such as through migration or isolation, allows subcultures to adapt their tropes to new environments. Migrant

communities, for instance, often preserve core elements of their parent culture while integrating new influences, creating unique cultural hybrids (Appadurai, 1996). In cases of extreme isolation, subcultures may evolve independently, developing entirely distinct frameworks of meaning that address the specific needs and challenges of their new context.

Social separation, whether voluntary or imposed, also fosters divergence. Marginalised or segregated subcultures, such as those in ghettos or prisons, may reinforce their distinctiveness by creating internal systems of meaning, norms, and practices that reflect their unique circumstances (Wacquant, 2001). This process not only solidifies their identity but can also lead to the emergence of new tropes that critique, resist, or entirely reject the parent culture. For instance, the hip-hop movement arose from socially excluded communities, developing tropes of resistance, empowerment, and self-expression that initially diverged from the dominant culture but later transformed it profoundly (Rose, 1994).

The interaction between subcultures and parent cultures varies with context. When subcultures maintain contact with the dominant culture, they often act as incubators of innovation, introducing new tropes that may eventually diffuse into the mainstream (Maffesoli, 1996). Conversely, prolonged separation can lead to significant cultural divergence, akin to the concept of speciation in biology (Boyd & Richerson, 1985). In some cases, the re-integration of these divergent subcultures can catalyse transformative change within the parent culture, as their unique perspectives and practices challenge established norms and broaden societal horizons.

Subcultures, therefore, embody both continuity and change. They act as bridges between tradition and innovation, preserving and reinterpreting shared tropes while developing distinct frameworks that reflect their unique identities (Willis, 1977). Whether through interaction or isolation, subcultures play a vital role in the evolution of cultural systems, driving both adaptive and transformative change.

Conclusions

The intricate interplay between reality, beliefs, schemata, tropes and culture forms the foundation of human cognition and cultural evolution. As illustrated in Figure 3, reality, encompassing the natural and social environment, provides the raw material for beliefs, which can be altered by individual experiences and societal influences. These beliefs, in turn, coalesce into schemata, the cognitive frameworks that help individuals interpret their surroundings and guide their behaviour. When shared across groups, these schemata give rise to tropes, collective structures that reflect and reinforce societal values, norms, and practices. Finally, several tropes together form a culture.

Schemata are real and exist within the mind of the individual. Tropes and culture are entities formed by aggregations of those schemata. Whilst the former may appear to be abstract, in the same way as “justice”, they exist in several discrete places distributed across space and time. They are equally real therefore, but less tangible. Ultimately, tropes and cultures are information held by individuals in schemata communicated via beliefs and actions. This has a number of implications.

Firstly, whilst we may say that culture and tropes influence schemata, this is a form of shorthand. In reality, an individual’s schemata are influenced by those of the many other

individuals with whom he interacts. This is not directly but via behaviour and the transmission of beliefs. Those schemata may then aggregate to form a trope which may, in turn, aggregate with other tropes to form a culture.

Secondly, the culture and structure of society are not independent but interact to modify one another. Again, this is a form of shorthand. In reality, interaction takes place in the minds of individuals using schemata as a basis. As people reflect on unsatisfactory cultural or structural demands, they engage in problem solving and may conclude that changes to culture, structure or both are needed. However, it is not always the case that, for example, a cultural dissatisfaction leads to a cultural solution. It may lead to a structural one. For example, dissatisfaction with cultural norms around gender roles may lead to structural changes, such as implementing workplace policies that promote equality. Conversely, structural dissatisfaction, such as widespread economic inequality, may inspire cultural shifts, such as movements advocating for fairness and solidarity. Individuals propagate such solutions into society by sharing them with others who may absorb them into their schemata. In this way, structure and culture interact dynamically.

Finally, through reflection on unsatisfactory cultural and structural demands, individuals are agents of social change. Thus, any desired change can only be through changes in the individual, their schemata and in their communications.

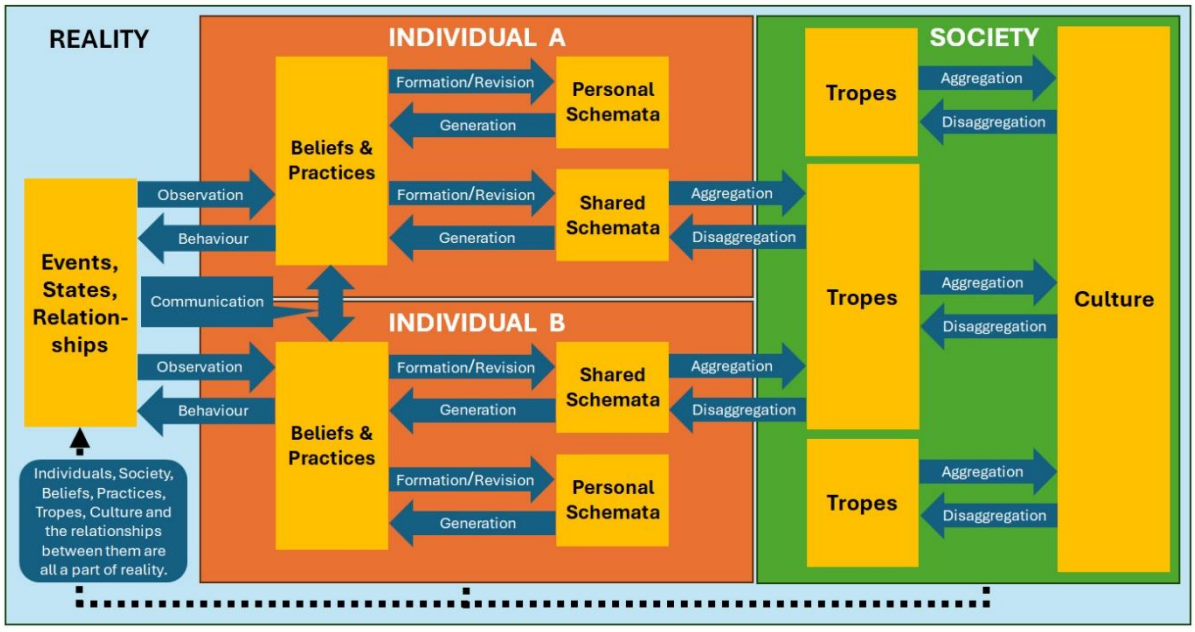

Figure 3. The Relationships between Reality, Beliefs, Schemata, Tropes and Culture.

This article has demonstrated how these elements interact in a dynamic and recursive process. Schemata, and thus tropes and culture, evolve over time, adapting to changes in reality whilst also shaping perceptions of it. Through processes such as assimilation and accommodation, individuals and societies continuously refine these frameworks to better align with new information, experiences, and challenges. The Modified Morphogenetic Cycle provides a useful framework for understanding these interactions, particularly the feedback loops that link individual agency, societal structures, and environmental factors.

Understanding the roles of schemata, tropes and culture has significant implications for addressing contemporary challenges. From fostering interdisciplinary collaboration to enhancing problem-solving strategies, these frameworks offer valuable tools for navigating complexity. By recognising the subconscious influence of schemata and the transformative power of tropes and culture, individuals and societies can critically examine existing paradigms and embrace innovative approaches to cultural and social evolution.

Notably, this article itself can be seen as a schema, integrating multiple concepts into a coherent framework. Like the schemata it describes, this schema could not be expressed succinctly and required detailed explanations of its components to build up the general picture. Diagrams, like Figure 3, were necessary to illustrate the relationships among these components effectively. This difficulty in expressing schemata directly underscores a key point made in the article: that schemata are non-verbal and often operate beyond conscious awareness, necessitating indirect representation through detailed narratives, visual aids, or shared cultural tools.

As we confront an increasingly interconnected and rapidly changing world, the ability to analyse and adapt these cognitive and cultural frameworks becomes ever more vital. Whether in scientific inquiry, policymaking, or everyday decision-making, the insights offered by this exploration can guide efforts to bridge divides, foster creativity, and create sustainable, inclusive futures.

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