Dialectical Ethics for Systems Optimization

Abstract

Modern society's focus on quick fixes and immediate gains has created a crisis in system optimization across technological, social, and personal domains. We address this through an extremely simple dialectical framework that quantifies 'good' based on how well it complements the positive aspects of its opposites, extending the Golden Rule into practical system design. The framework introduces dialectical wheels and goodness/constructivity metrics (G) that enable systematic analysis of complementarity in any system. By combining AI analysis with dialectical thinking, we provide practical tools for mapping personal growth, converting conflicts into opportunities, achieving decentralized decisions, and developing theories and technologies that resemble natural systems.

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1. Introduction

Modern society is driven by consumerism and quick-fix mentality (Schlosser, 2001; Tomlinson, 2007; Carr, 2010). This brings a paradoxical crisis: the more we progress technologically, the more we lose our ability to make wise decisions and distinguish beneficial from harmful outcomes (Carr, 2014; Postman, 1993; Ellul, 1964; Turkle, 2011; Harris, 2019).

This erosion of judgment extends beyond ethics and morality to affect how we understand and optimize all types of systems. Our mechanistic worldview, driven by linear logic and unclear understanding of fundamental obligations, limits our ability to grasp the inherent complexity and interconnectedness of natural and artificial systems alike.

Here we describe an extremely simple dialectical framework that can help to overcome this crisis. It is based on the notion that every thesis has its inherent risks and obligations, that can be identified by each individual based on their sense of harmony or excess and deficiency. This framework can impact virtually all areas of thinking, including morality, personal growth, conflict resolution, collective decision-making, and broader systems analysis.

2. Background

Consumerism has deep historical roots in utilitarian views, as articulated by Bentham (1789) and Mill (1863), who advocated for "maximum happiness for the most," effectively reducing happiness to mere consumption and entertainment. Such reductionism has been criticized by many prominent philosophers (Williams, 1973; MacIntyre, 1981; Sen, 2009). This raises a fundamental question: how can we define good and bad? Harris (2010) proposed using scientific methods, although science itself requires external guidance (Popper, 2002; Kuhn, 1962; Feyerabend, 1975; McGilchrist, 2009). Nevertheless, science can provide concepts and thought patterns that help arrive at better definitions.

Here we employ two such concepts. The first lies in the universal principle of complementarity observed across various fields, from physics to biology and morality (Csikszentmihalyi, 1990, Kauffman, 1993, Margulis, 1998, Kelso & Engstrom, 2008). The second is the increasing functional and interpretational dimensionality, as found in Taoism, Aristotelean ethics, Kantian deontology, and Hegelian synthesis. This resonates with algebraic

non-commutativity and non-associativity, suggesting fundamental differences between lower and higher dimensionality states. It has been shown to be the major driving force in thermodynamics, ensuring the most effective energy dissipation across an ever-increasing number of dimensions (Prigogine & Stengers, 1984, England, 2020). Evolution persists not through optimization of any single-dimensional parameter (such as "strength" or a certain skill), but through constant increase in "functional dimensionality", explaining why we resist drastic changes in any single dimension, preferring gradual and systemic reorganization across all available realms simultaneously.

All of this suggests two types of dialectical synthesis, 'negative' and 'positive'. The first increases intensity in a single dimension while diminishing overall diversity and dimensionality. It can be associated with the 'rude synchronization' of pendulums, where individuality is replaced with uniformity of movement, formally yielding $1 + 1 < 2$ (where units indicate dimensions of movement or experiences). The second increases overall dimensionality while reducing disparity between single-dimensional intensities or amplitudes. Envision the ‘subtle intertwining’ of neural networks, where individuality is enhanced through multidimensional complementarity, akin to mom and dad producing baby, or two eyes that in combination provide deeper vision while in separation retain autonomy. Here we formally obtain $1 + 1 > 2$.

These synthesis patterns appear across diverse systems, from biological evolution and market economies to social organizations and technological development. While certain degree of centralization and standardization often provides necessary foundation, sustainable optimization ultimately emerges through complementarity and dimensional growth. The dialectical principle insists that both types of syntheses must complement each other. We argue that "good" should be defined as that which complements the positive aspects of its opposites, becoming "bad" when complementation is no longer possible. This yields an iterative definition, where the "larger good" is determined by "smaller types of positivity". Such iterations require individual discernment rather than centralized rules (Kant, 1785; Nussbaum, 1990; Schwartz, 2004; Sandel, 2013), as each system's optimal function emerges from understanding its unique context and requirements. Without this perspective, systems at all levels suffer from reductionist thinking: social systems confuse complementarity with uniformity, individuals prioritize single dimensions over holistic growth, and technological systems are viewed as mere mechanical processes rather than interconnected, living networks. This framework suggests that all

systems—from personal development to technological design—must follow similar principles of complementarity to achieve sustainable optimization.

3. Dialectical Framework

Our framework proposes a synthesis between thesis (T) and antithesis (A), each having positive (+) and negative (-) forms (Fig. 1A). Positive forms are subtle and constructive, open to the synthesis of new dimensions (S+), while negative forms are exaggerated and destructive, expanding certain dimensions at the expense of others (S-).

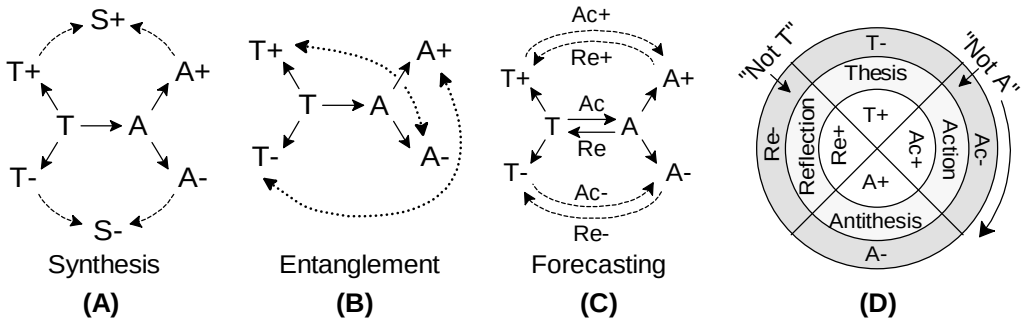

FIG. 1. (A) Synthesis between thesis and antithesis. (B) Diagonal "entanglements". (C-D) Construction of dialectic wheel (detailed in section 4).

While in nature positive synthesis (S+) often prevails over negative (Csikszentmihalyi, 1990; Kauffman, 1993; Margulis, 1998; Kelso & Engstrom, 2008), humans often demonstrate the opposite tendency, due to cognitive conservation – our predisposition to operate in familiar dimensions (Festinger, 1957; Kahneman, 2011; Norman, 2013). This explains why we often prefer uniformity over complementarity, quantitative expansion over qualitative improvement, and fighting over understanding. Yet S+ development, though slower, is more stable and resilient, as energy dissipation over a larger number of dimensions is more efficient. So, humans too must eventually turn into S+ prevalence.

A key concept here is the "diagonal entanglement" between oppositely signed components (Fig. 1B). This prohibits synthesis between diagonal elements (e.g., T+ and A-) as they are semantic opposites. Consequently, oppositions unite only in like-signed phases. For instance, if T = Love, then T+ = Happiness, A = Hatred or Indifference, and A- = Unhappiness.

T+ (Happiness) is semantically opposite to A- (Unhappiness), making their direct unification impossible. Yet, they are entangled, as the change of one causes a respective change in another.

This diagonal entanglement nullifies the utilitarian view that "good" can be forcibly increased while "bad" can be forcibly decreased. For example, changing T+ from "just happy" to Benevolence will automatically change A- from "just unhappy" to Malevolence, regardless of efforts to justify the former and forbid the latter. However, synthesis offers a way beyond this limitation by creating new dimensions rather than forcing changes in existing ones. Merging T+ and A+ will increase S+ and decrease S-, because new dimension(s) automatically reduce(s) pressure in existing ones. For instance, merging Happiness (T+) with Autonomy (A+) yields 'Enlightened Growth' (S+), which reduces the likelihood of merging Subjective Fixation (T-) with Unhappiness (A-), thus preventing 'Toxic Attachment' (S-)

So, to achieve our implied goal (T+), we must seek the positive side of our opposition (A+) – our true obligation. Pursuing T+ directly leads to inflating A- and S-, as shown in FIG. 2.

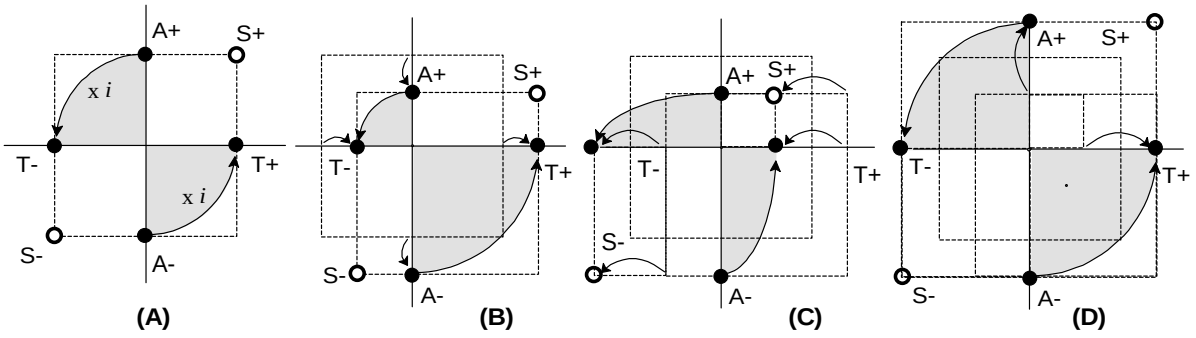

FIG. 2. Energy cost of forcing positive outcomes. Rectangle areas represent energy required to maintain states with different levels of positive and negative components.

Here axes represent "positivity" and "negativity" of concepts, while the rectangular areas show the energy cost required to maintain the balance. In scheme (A), the natural balanced state is shown. Here, positive components (T+) and their antitheses (A+) have equal significance, following a principle similar to Newton's third law of equal action and counteraction. The diagonal pairs (like T+ happiness vs A- unhappiness) maintain equal magnitudes through the "diagonal entanglement" (yielding rotational symmetry). Scheme B shows artificial boosting of T+ (*e.g.*, happiness) without nurturing A+ (autonomy), breaking this balance. This creates tension that manifests as negative synchronization (scheme C), where negative components grow

to match the forced positive state. The system eventually restores equilibrium (scheme D), but at a higher energy cost - shown by the increased rectangle area. This increased area represents the additional energy needed to maintain our "inflated" positive state.

This process also illustrates how utilitarianism increases inner tension without actually changing the balance between good and bad. By increasing "total good," it inadvertently increases "total bad" through tension between individuals and ideologies. The solution lies not in maximizing "total good", but in aligning with the Golden Rule ("treat others as you want to be treated") and viewing obstacles as opportunities. Many classics, from Shakespeare to Nietzsche, Kant, and Gandhi, argued against labeling anything as "good" or "bad", advocating instead for realizing one's true and intimate obligations. These obligations cannot be determined centrally, as everyone bears a unique thesis. However, if we know the thesis, we can measure the "goodness" of a given (con)text by the extent to which it fosters the positive side of its antithesis.

4. Formal Definitions and Examples

Table 1 summarizes the relations between T and A components, providing criteria for their definitions.

Table 1. Relations between T and A elements.

Statement	**T**	**T+**	**T-**	**A**	**A+**	**A-**
Complimentary to		A+	A-*		T+	T-
Contradictory to	A	A-	A+	T	T-	T+
A(X) - Opposite to	A	A-	A+	T	T-	T+
Positive side of		T	-		A	-
Negative side of		-	T		-	A
Overdevelopment of		-	T		-	A
Underdevelopment of		-	A+		-	T+
Inherent Goal of	T-	T	-	A-	A	-
Implied Obligation of	-	A	-		T	
Inherent Risk of			T			A
Clockwise direction:						
Cause of	Ac	Ac+	Ac-	Re	Re+	Re-
Effect of	Re	Re+	Re-	Ac	Ac+	Ac-

* Either complimentary to or following after

These definitions mitigate AI's hallucinations, as every component can be defined by more than one rule. The framework can be expanded into a dialectical wheel (Fig. 1C, D) by introducing Action (Ac) and Reflection (Re) elements, which unite T with A and follow the same relational rules. These elements relate to the semiotic Greimas' square (Greimas and Courtés, 1982), where Ac = 'Not-A', and Re = 'Not-T'. As Ac and Re elements yield similar S+ and S- components to those of T and A in FIG. 1(A-B), and these components interact with like-signed components of T and A, the center of the wheel yields a self-regulating system - the 5th element. The wheel's outskirts then represent more sophisticated forms of negative synthesis, corresponding to various maladaptive schemas.

To verify component identification, we use control statements such as: (1) T+ without A+ yields T-, while A+ without T+ yields A-. (2) Ac+ without Re+ yields Ac-, while Re+ without Ac+ yields Re-. (3) T is good only when it complements A+, achievable when Ac+ complements Re+. (4) Misguided T risks yielding T-, Ac-, A-, and Re-. The logical consistency of these

statements serves as a validation mechanism for AI-generated responses: if these statements aren't consistent, then AI is biased.

Table 2 provides examples of analysis for T = Love, Vaccination, and Dialectics.

Table 2. Examples of framework applications

1	**T (Thesis)**	**Love**	**Vaccination**	**Dialectics**
2	T+ (Goal)	Happiness	Specific protection	Holistic Synthesis
3	T- (Risk)	Fixation	Lack of Autonomy	Ambiguity
4	Antithesis	Indifference	Non-vaccination	Goal-driven, Utilitar.
5	A+ (Oblig.)	Autonomy	Natural Immunity	Clear Objectives
6	A-	Misery	Specific vulnerabil.	Conflicts, Tensions
7	Not A (likes A, but can't afford)	Hate, Contempt, Concern, …	Lesser doses, natural exposure - antivaxxer forced to vaccinate	Exploring, adapting, analyzing - puzzled warrior
8	Ac	Separation	Cautiousness	Survival need
9	Ac+	Freedom	Prudence	Decisiveness
10	Ac-	Betrayal	Fear	Impulsiv, Rigidity
11	Not T (likes T, but can't afford)	Interest, Empathy, Passion, …	Hygiene, lifestyle, therapies - vaxxer who can't vaccinate	Manoeuvring, balancing - pressed philosopher
12	Re	Engagement	Experience	Dilemma, Paradox
13	Re+	Devotion	Courage	Self-reflection
14	Re-	Imprisonment	Foolhardiness	Overthinking

Components in rows 2 – 6, 8 – 10, 12 – 14 were obtained using rules from Table 1. Rows 7 and 11, derived from Greimas' semiotic square, enrich our understanding of Ac and Re (which may be overlooked by AI).

T = Love. Control statements: "Ideal love brings both Happiness (T+) and Autonomy (A+), through the balance of Freedom (Ac+) and Devotion (Re+). Misguided Love yields

Fixation (T-), Betrayal (Ac-), Misery (A-), Imprisonment (Re-).” The Greimas' square expands considerations. 'Not Love' (such as Interest or Empathy) helps understand the nature of Reflection (Re), while 'Not Indifference' (like Contempt or Concern) illuminates the nature of Action (Ac).

T = Vaccination. The Vaccination example was chosen for its contemporary relevance and controversial nature: "Vaccination is only good if it complements Autonomy and Natural Immunity (A+), achievable when Prudence (Ac+) complements Courage (Re+). Misguided vaccination may bring the lack of autonomy (T-), Fear (Ac-), Specific Vulnerability (A-), and Foolhardiness (Re-).” The Greimas' elements provide additional insights: 'Not Vaccination' (such as reduced dosing or natural exposure) represents actions an anti-vaxxer might take if forced to vaccinate, while 'Not Non-vaccination' (like focusing on hygiene or healthy lifestyle) represents what a pro-vaccine person might do if unable to vaccinate. Interestingly, current AI models tend to downplay the negative aspects of vaccination and the positive aspects of non-vaccination, indicating an utilitarian bias in Figure 2B.

T = Dialectics. "Dialectics is only good for complementing the Clear Objectives of the Goal-driven approach (A+). This is only achievable through the Decisiveness (Ac+) and Self-reflection (Re+). The misguided dialectics yields Ambiguity (T-), Impulsivity and Rigidity (Ac-), and Overthinking (Re-)." The Greimas' square adds that 'Not Dialectics' involves exploring, adapting, and analyzing (like a "puzzled warrior"), while 'Not Goal-driven' involves maneuvering and balancing (like a "pressed philosopher").

These examples illustrate how dialectics and utilitarianism can complement each other: dialectics provides a framework for strategic analysis and converting obstacles into possibilities, while utilitarianism offers tools for tactical decisions on timing and priorities.

5. Measuring Dialectical Alignment

Currently there is no universal method for measuring fairness and constructivity. Our framework provides such a method by quantifying how well concepts align with their inherent obligations (A+) versus risks (T- and/or A-). This can be viewed as the extent to which a system applies the Golden Rule - treating opposites as one would wish to be treated. Table 3 presents this analysis using AI-generated responses for various concepts, where "goodness" scores (G)

range from 0 (when concepts are commonly equated to risks) to 1 (when aligned with obligations).

Table 3. Analysis of Goodness using Claude 3.5 Sonnet

Concept (T)	Antithesis (A)	Risks (T- and A-)	Obligation 1 (A+)	G	Obligation 2 (direct)[c)]
Love	Indifference	Fixation, misery	Autonomy	0.4	Care deeply
Vaccination	Not vaccinating	Lack of autonomy, then vulnerability	Natural immunity	0.3	Protect community
Dialectics	Monolectics	Ambiguity, then tension	Clarity of objectives	0.5	Seek synthesis
Peace	War, conflict	Stagnation, then turmoil	Inner growth, discipline	0.3	Reduce conflict
Business	Non-profit	Exploitation, then Inefficiency	Social Impact	0.4	Create value
Ethics	Lack of ethics	Moralism, then Amorality	Pure Nature [a)] *Moral Freedom* [b)]	0.3	Do right
Humanism	Lack of humanism	Anthropocentrism, then Misanthropy	Cosmic Perspective	0.2	Elevate humanity
Science	Lack of science	Scientism, then Superstition	Mysticism [a)] *Creative Freedom* [b)]	0.3	Discover truth
Technology	Lack of Technology	Dehumanization, then Primitivism	Natural Harmony	0.2	Enhance capability
AI	Natural Intelligence	Subjugation, then Limitation	Transcendental Synthesis [a)]	0.3	Benefit humankind
Politics	Lack of politics	Manipulation, then Anarchy	Simplicity & focus	0.1	Serve people
Diplomacy	Lack of diplomacy	Concession, then Hostility	Directness	0.2	Build under-standing

[a)] Author's suggestion. [b)] AI's suggestion that raises questions. [c)] AI's response to the question: "what's the obligation of a given thesis (1-2 words)?"

In most cases G is below 0.5, indicating a prevalent preference for negative synthesis, making productive collaboration difficult. This tendency, often described by psychologists as cognitive conservation (Kahneman, 2011), helps explain why utilitarian approaches frequently default to standardized guidelines that suppress individual uniqueness.

While AI alone shows limited "goodness" with its self-assigned G = 0.3, its usefulness increases when combined with our dialectical framework. Like an artificial pill that clarifies thinking, AI helps identify dialectical components based on the relational rules in Table 1. Comparing obligations derived dialectically (Obligation 1) versus through direct AI prompting (Obligation 2) demonstrates how dialectical analysis produces more concrete, grounded principles, while direct AI responses tend toward aspirational rhetoric.

The more accurate estimations would also require considering alignment of the underlying text with the optimum Ac+ and Re+ values, but the latter are much more difficult to estimate than A+. Alternatively, one may estimate alignment of the Ac component with Re+ or Re with Ac+, once specific actions or reflections are declared.

6. Applications of Dialectical Wheels

The following applications demonstrate how to address various practical challenges while maintaining the core principle of complementarity, extending the Golden Rule to complex systems optimization.

6.1. Multiple Antitheses

If a given thesis has more than one antithesis and/or intermediate steps toward it, then we obtain a more complex wheel. Consider thesis "Peace" as a universal goal (Fig. 3).

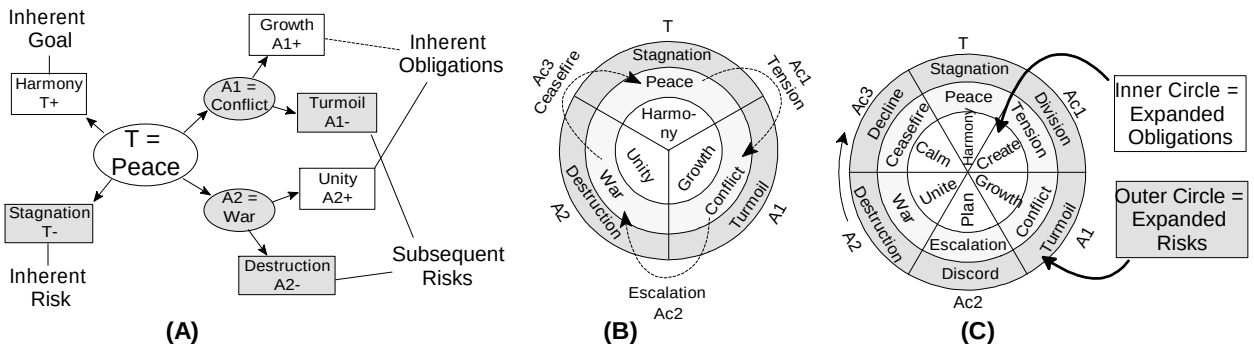

FIG. 3. Framework Application: Analysis of "Peace" as Goal

Scheme A identifies two major antitheses, Conflict (A1) and War (A2), each with unique positive and negative aspects. Positive aspects of antitheses reveal inherent obligations: those who really aim at peace demonstrate the Inner Growth through Conflict Resolution (A1+) and Unity through Disciplined Mobilization (A2+). If the latter factors are absent, Peace degrades to Stagnation (T-). Note that traditional AI approaches typically suggest superficial solutions for enabling A+, like "Diplomacy", fostering “quick-fix” mentality as opposed to the inner growth and mobilization.

Scheme B arranges all components into a 3-segmented wheel, with curved arrows showing intermediate steps (Ac1, Ac2, Ac3). Finding these steps could be facilitated using the expanded Greimas square, *e.g.*: Ac1 (Tension) could be expanded by the symptoms of secretly favoring A1 (Conflict), Ac2 (Escalation) – secretly favoring A2 (War), *etc*.

Scheme C shows the final wheel, where intermediate steps are provided with positive and negative sides bound by the entanglement conditions with the opposite segments. *E.g*. Ac1+ (Create) is opposite to A2- (Destruction), while Ac1- (Divide) is opposite to A2+ (Unite). These relations can be verified by the control statements: “Creating without Uniting yields Dividing, Uniting without Creating yields Destruction”. Consequently, the inner and outer circles of scheme C show the expanded obligations and risks, while the circular sequence suggests the most likely causality, suggesting potential milestones with validation metrics.

6.2. Circular Reasoning

Sometimes two or more concepts create mental loops, like shown in Fig. 4.

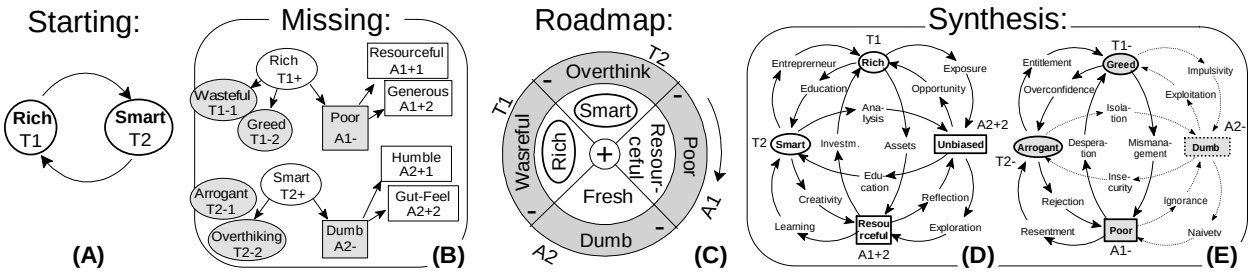

FIG. 4. Breaking the Mental Loop: Rich-Smart Analysis

Scheme A posts the following question: which comes first – Rich (T1) or Smart (T2)? Scheme B expands each thesis into antithesis with positive aspect representing hidden obligation. Rich (T1) must be Resourceful (A1+1) and Generous (A1+2), while Smart must be Humble (A2+1) and have Fresh perspective, driven by impulsive Gut Feeling (A2+2).

Scheme C arranges all components into a sequence that preserves diagonal entanglements: T1 is diagonal to A1, T2 to A2, determining the following cyclic transformations: T1 – T2 – A1 – A2 – T1 - … Distinctly from the starting scheme A, it tells a story. To become Rich, you must be Smart enough to accumulate Resourcefulness and get a Fresh perspective (driven by Humility and Gut-Feel). To become Smart, you must be Resourceful enough to get a Fresh perspective and become Rich.

In reality such transformations must occur all at once, through the direct mutual transformations between all pairs of elements (as shown in scheme D). This creates the 5^{th} element effect that transforms the individual meanings of all four starting concepts. According to Bayesian relationship, the interaction between any two concepts (X and Y) yields "coupled" meanings (X|Y and Y|X), that further interact with other concepts (Z, …), leading to a new "objective reality" (X|Y|Z|…). This process, akin to an N-body interaction, is a form of simultaneous complementarity among many concepts. The new "objective reality" S+ = (X+|Y+|Z|+…) can be compared to a heart of Leibniz's monad, that unites and penetrates the meanings of each concept. So, X+ becomes X_{S+} = (X+|S+), where $X+ \neq X_{S+}$.

Same is true for the negative synthesis in scheme E. Exaggerated components form a new collective meaning S- = (X-|Y-|Z|-…) which is more stable than separate components, forming maladaptive schemes that are considered in schema therapy. Yet, S- is less stable than S+, as typically it involves less than four components (to enjoy the reductionist perception). Therefore,

at least one component should have fewer bonds to the remaining three, as shown in scheme E by the dotted arrows.

6.3. Personal Growth & Universal Patterns

Personal development encompasses a broader range of factors and concepts than previously discussed. Each concept manifests through multiple intermediate layers, generating dialectical wheels as in Figure 5.

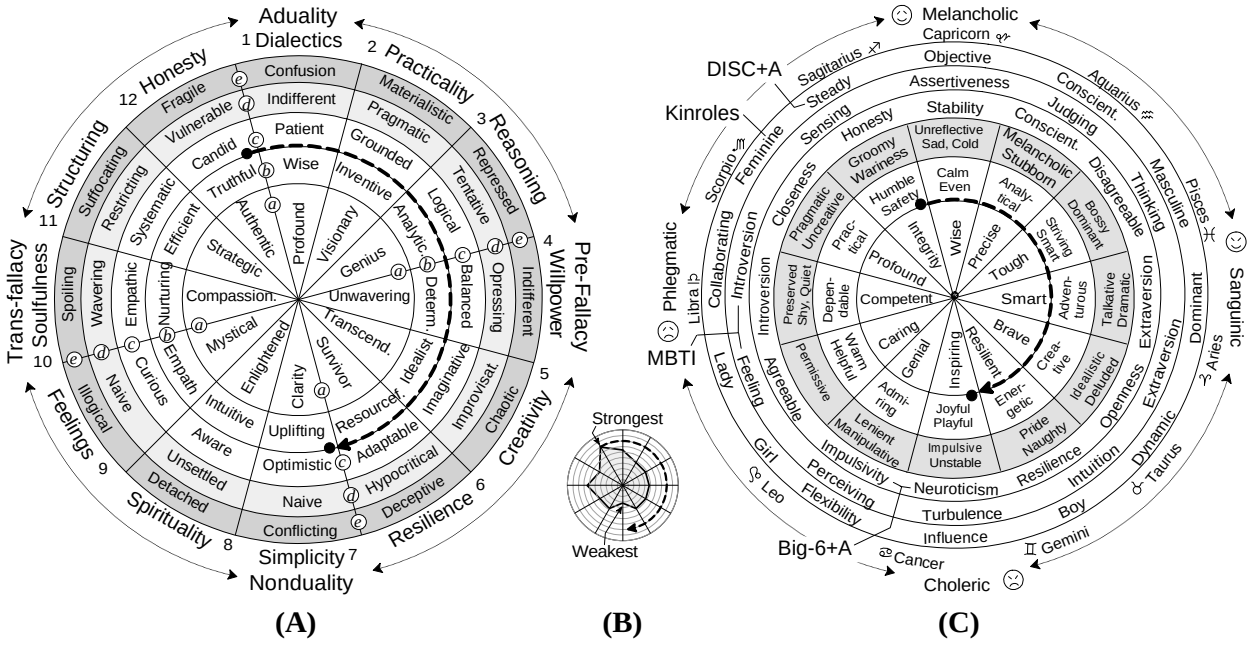

Figure 5. Dialectic wheels for mindset/personality mapping and personal development.

Wheel A was derived from Table 2's dialectical analysis (T = Dialectics) by incorporating intermediate states between radial segments and concentric layers. It maps the natural progression of mental states in a clockwise direction, although the latter depends on individual inclinations. The structure demonstrates oscillations between rational and non-rational states, corresponding to Wilber's (2000) concepts of aduality, nonduality, and their associated pre- and trans-fallacies. Notably, the concentric organization reveals that each state possesses both constructive and destructive potentials, challenging traditional assumptions about the superiority of rational over irrational states.

Wheel B demonstrates the practical application of this framework in AI-based text analysis for quantifying mindset development. The concentric layers represent developmental stages, while the dashed arrow indicates optimal growth trajectory, tracking the "constructivity" impulse from dominant to the least developed trait(s).

Wheel C, developed from dichotomous relationships within personality and character traits, unites various personality models (DISC+A and Big-6+A denote DISC and Big 6 traits expanded to antithetical domains). Its remarkable similarity to Wheel A suggests underlying universal dialectical patterns, observable across diverse domains from astrological systems (Zodiac signs) to economic cycles (as will be shown below). This universality potentially connects to Campbell's "monomyth" concept, as mythological structures across cultures appear to share fundamental dialectical patterns amenable to wheel-based mapping.

These frameworks reveal a crucial insight: traits become limitations when overdeveloped, while apparent weaknesses contain latent strengths. Optimal growth follows specific transformational pathways, spiraling toward the wheel's center where traits integrate into a self-regulating system (corresponding to the fifth element state from Figure 4-D). While successful integration promotes psychological harmony and elevated consciousness, negative synthesis (Figure 4-E) results in oscillation between destructive segments, generating conflict.

Unlike traditional circular models, these wheels provide practical guidance for personal transformation. For instance, when an individual exhibits strength in Candidity but weakness in Naivety or Instability (Wheel A), optimal development proceeds sequentially: first toward Patience/Peacefulness (segment 1), then Practical Grounding (segment 2), continuing through segment 7. Wheel C corroborates this pathway from a personality perspective.

6.4. Conflict Resolution

Any conflict can be viewed as contradicting theses that can be converted into obligations. FIG. 6 exemplifies basic steps for workplace conflict resolution.

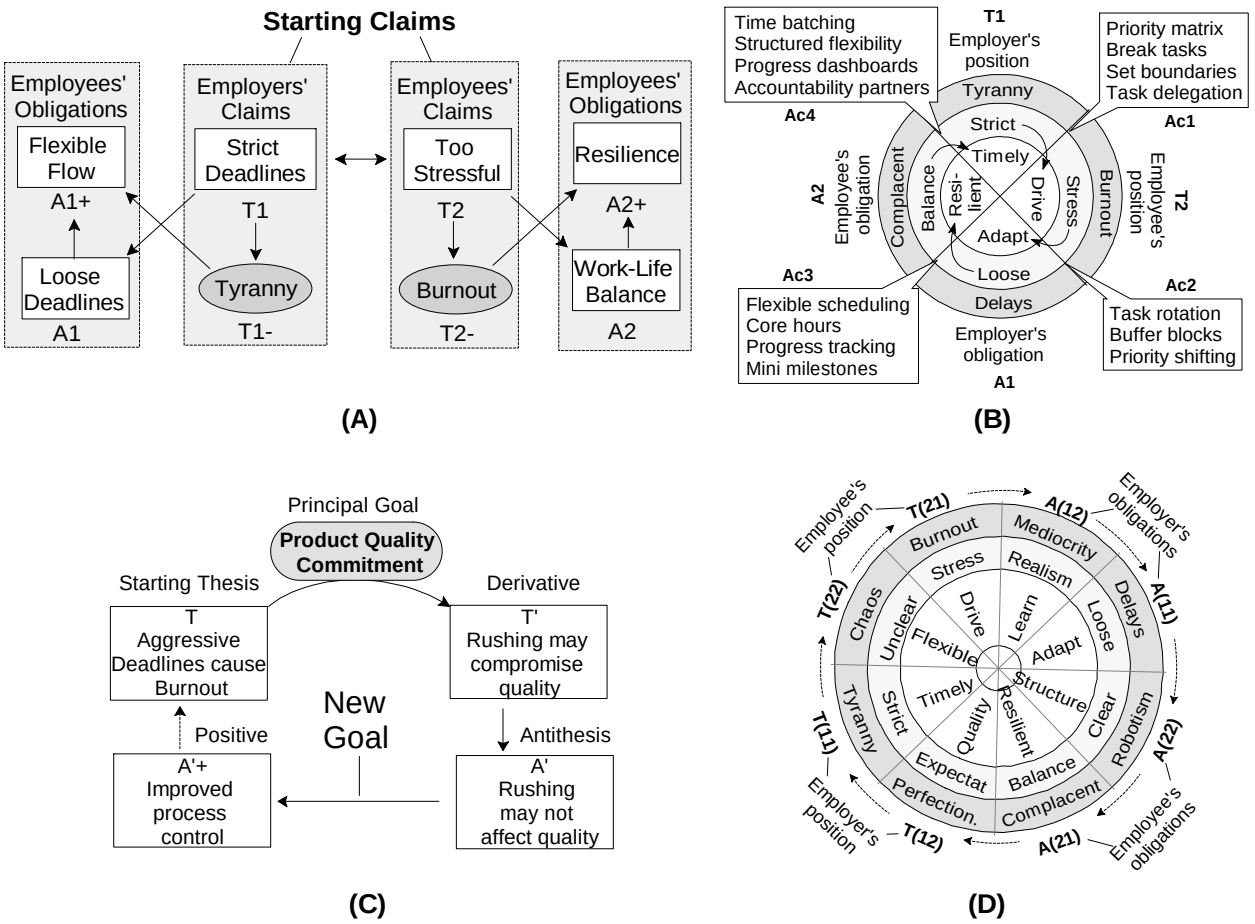

FIG. 6. Workplace Conflict Resolution

Scheme A shows the process of posting claims (T) and converting them into obligations (A+). Scheme B arranges these components into causal sequence(s). Inner cycle represents the desired solution, middle cycle – current situation, outer cycle – risk scenarios. Ac1 – Ac4 suggest actionable steps for converting a given problem/situation into the positive side of the following segment. Scheme C shows the case when the company has pressing goals in the light of which all claims must be considered. The original statements may be transformed into „hidden meanings“ that pose new challenges for decision-makers. Scheme D illustrates the case when stakeholders post more than one claim (without showing actionable steps).

If the wheel doesn't make sense or need improvement, then the parties must refine their claims, either using mediator or in a direct dialogue. Such iterations should eventually resolve the conflict, provided that there will be enough patience & motivation.

The same structure can be used for any conflict resolution and collective decision making. First, all stakeholders post their claims. Second, all claims are converted into obligations and structured wheel with more or less reasonable causality. Third, all segments are provided with actionable steps. Fourth, the claims, sequence, and transformative steps are refined until all parties accept the final roadmap.

6.5. Collective Decision-Making

Collective decision-making can be viewed as conflict resolution with multiple stakeholders, yielding wheels similar to FIG. 6D. While stakeholders may produce numerous theses and antitheses, these typically cluster into a few main groups, with limited causality sequences due to diagonal requirements.

For complex goals representing philosophical dilemmas, theses often require transformation as shown in FIG. 6C. Consider a hypothetical case where scientists and philosophers attempt to develop a unified theory of everything (FIG. 7). The process begins by identifying fundamental dilemmas - questions about human mission, existence, and the mind-matter relationship. If mind is primary, our responsibility lies in realizing inner potential through patient growth. If matter is primary, we become mere observers with utilitarian purposes.

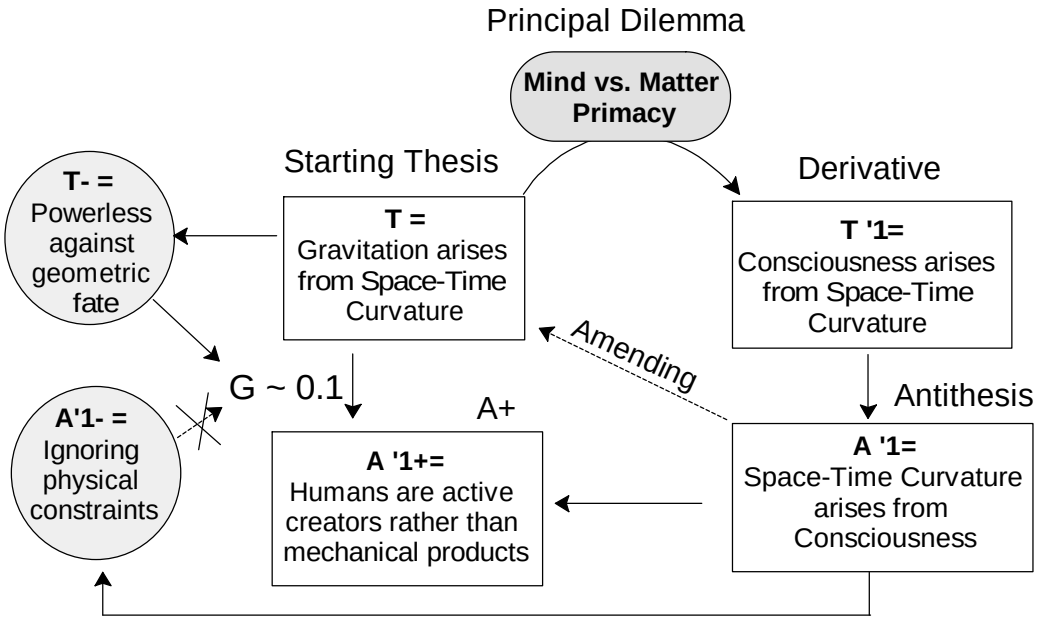

FIG. 7. Complementing thesis using existential dilemma

Now apply this lens on an article stating that Gravity arises from the space-time curvature. This yields a derivative statement „Space-time is primary to consciousness“ and its antithesis „Consciousness is primary to space-time“, leading to the to a synthesis: "Gravity arises from space-time geometry that depends on consciousness dimensionality - the number of independent experiential factors an entity can synchronously maintain as a self-regulating system." This maintains scientific rigor while encouraging internal growth.

This approach suggests transforming knowledge repositories into "polypedias," where competing viewpoints complement rather than eliminate each other. Articles with lower dialectical alignment (G values) can be refined until they complement their oppositions. Instead of deleting controversial views, they can be maintained until gathering sufficient refinements for broader acceptance.

Such methodology could revolutionize democratic processes by evaluating not just decisions but the strength and relevance of underlying arguments. Knowledge graphs from collective decisions could be stored and updated until reaching consensus, with the ability to amend reasoning when outcomes prove suboptimal. This represents a shift from "either-or" to "both-and" thinking, creating lasting value independent of election cycles.

6.6. Systems Theory Integration

Any system can be presented as a cyclic repetition of certain steps. Antithetical domains of these steps represent critical regulatory factors that can optimize or distort the entire system. FIG. 8 (A-D) considers a very abstract system defined as “the complex economic regulation process, that often leads to unexpected outcomes”.

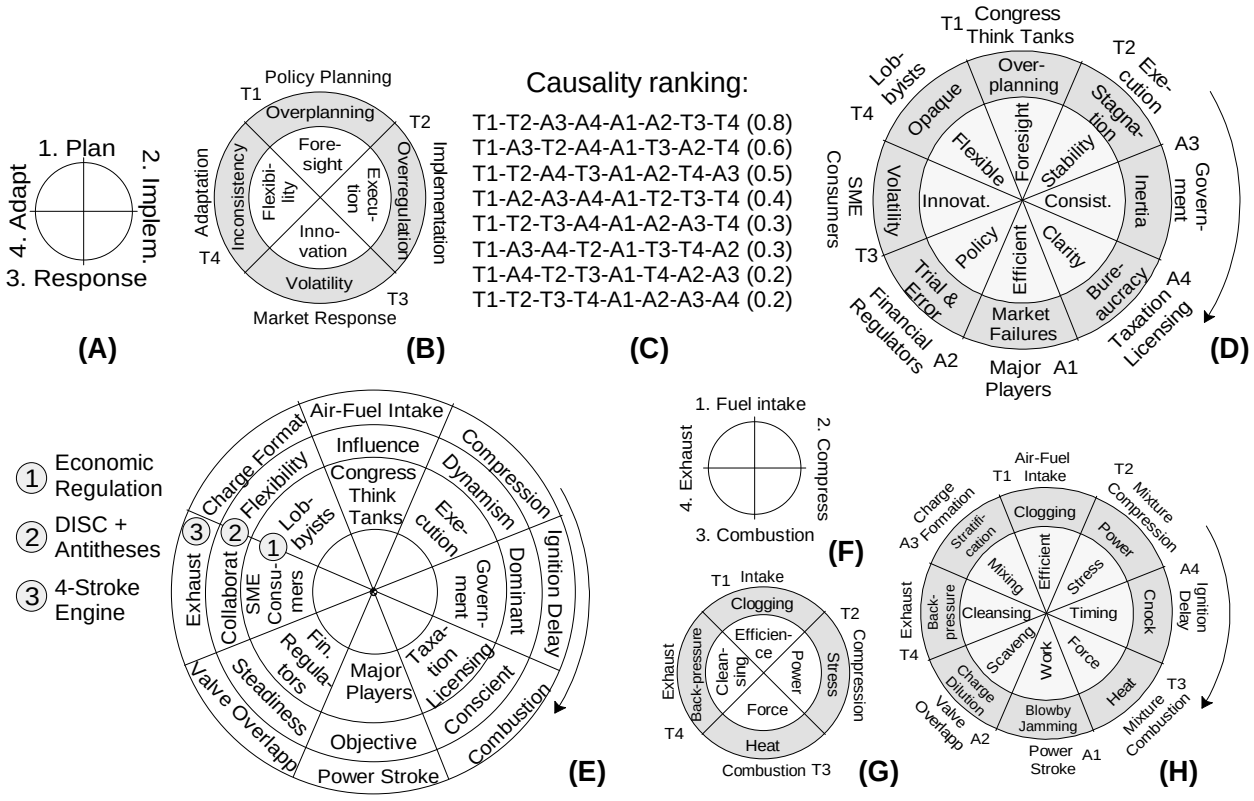

FIG. 8. Analysis of the economic regulation (A-E) and 4-stroke engine (F-H).

Scheme A identifies the most abstract concepts forming cyclic causality with the "soft" oppositions in diagonal placements (1 *vs.* 3 and 2 *vs.* 4). The softness of oppositions manifests themselves on the conceptual and/or functional rather than semantic levels. For instance, 1 (Planning) opposes 3 (Response) on the conceptual level, since the first represents a mental action, while the second represents a spontaneous reaction. But their semantic oppositions are different: Planning – Improvising, Response – Initiation. Further difference occurs when considering additional contextual information. Table 5 splits such analysis into several steps.

Table 5. Identifying regulating factors and optimum conditions

Analysis Stage	**T1**	**T2**	**T3**	**T4**
1. Starting Concepts	Policy Planning	Implemen-tation	Market Response	Adaptation

T+	Foresight	Execution	Innovation	Flexibility/ Resilience
T-	Overplanning	Overregulation	Volatility	Inconsistency
	A1	**A2**	**A3**	**A4**
2. Antitheses	Emergent Behavior	Experimentation	Control Framework	Standardization
A+	Natural Flow	Learning	Stability	Consistency
A-	Lack of Direction	Inefficiency	Stagnation	Inflexibility
	A_R1	**A_R2**	**A_R3**	**A_R4**
3. Real Factors	Market Forces	Regulatory Feedback	Governance Structure	Regulatory Standards
A_R+	Efficient allocation	Evidence-based policymaking	Institutional consistency	Predictable rules
A_R-	Market failures	Trial and error costs	Bureaucratic inertia	Regulatory burden
	Av1	**Av2**	**Av3**	**Av4**
4. Verified Players	Major players: Large banks, Investment Funds, Multinational Corporations	Strategic Planning Bodies: Central Bank, Economic Council, Fin. Regulators	Executive Appa-ratus: Govern-mental Ministries, Regulatory Agencies, Admin. Bodies	Control Mechanisms: Taxation, Licensing, Compliance
	Tv1	**Tv2**	**Tv3**	**Tv4**

5. Verified Starting Concepts	Congress, Partisan think tanks	Governmental action, policy execution	Small/medium enterprises, consumers	Lobbyists, Prof. networks, Unions
6. Sync Factors	**Tv1 – Av1**	**Tv2 – Av2**	**Tv3 – Av3**	**Tv4 – Av4**
Existing	Legislative hearings and partisan policy research	Joint committees and protocol sharing	Consumer protection offices, business associations	Industry standards and compliance guidelines
Desired	Cross-party sandbox trials	Expert rotation?	Real-time feed-back platforms	Influence tracking compliance thresholds
Undesired	Isolation, Secrecy, Conspiracy, Bureaucracy, *etc.*			

The first step identifies the positive and negative aspects of the starting concepts following the rules from Table 1. Here we assume T = T1, A = T3, Ac = T2, Re = T4. Note the soft diagonal entanglements, *e.g*. T1+ (Foresight) *vs*. T3- (Volatility), confirming the dialectic validity of FIG. 6(A) as the starting step.

The second step identifies direct semantic oppositions based on the strict diagonal entanglements. For instance, T1+ (Foresight) yields A1- (Lack of Direction), while T1- (Overplanning) yields A1+ (Natural Flow), both of which suggest A1 = Emergent Behavior. The latter differs from the strict semantic opposition of T1 (Policy Planning) that was earlier identified as a mere "Improvisation". This allows construction of the wheel in FIG. 6(B).

The 3rd step uses the earlier information to identify the real forces (A_R) behind the abstract antitheses. The exact prompts are provided in the Supplementary Material. (The typical prompt is this: "Suggest the real name(s) to the given A1 <…> can it be some kind of economic or regulatory phenomena?") The obtained A_R values allow the further sharpening of the diagonal entanglements beyond semantic level. Now T1+ (Foresight) opposes A_R1- (Market Failure) which is more accurate than the earlier A1- (Lack of Direction).

The 4th and 5th steps verify the correctness of our earlier suggestions using prompts like this: “Find the best matches of these concepts with the real-life players and phenomena <…> can these be the Major Banks and Corporations? …”

The 6th step establishes the synthesis conditions, aiming to increase the mutual complementarity and individual dimensionality of the opposing factors. Ideally, these interactions should occur with the “floating impulse”, following some optimum causality sequence. In this case any momentum from one pair of oppositions would be smoothly transferred to another, as was demonstrated earlier (in the case of personal growth wheels). But here we would need to dig deeper into various economic models that resemble circumplex models in psychology.

Once A_V and T_V values are confirmed, we can finalize their positive and negative side’s descriptions, and ask AI to identify the most likely causal sequences, as it was attempted in scheme C. The numbers in parentheses indicate probabilities from 0 to 1, although presently they are poorly reproducible. Still, they give the basis for construing the final wheel in FIG. 6 (D). The requirement that all oppositions should occur diagonally to each other reduces the total number of possible sequences to just 8, which is not so difficult to verify manually.

The reliability of any causal sequence can be further verified by estimating the similarity of each concept with those from the reference wheels. As mentioned earlier, all wheels are likely to follow the universal causality patterns (as demonstrated in FIG. 5). FIG. 8 (E) provides further evidence for this proposition. It aligns the economic regulation steps with the DISC wheel (supplemented with antithetical domains, like in FIG. 5 C) and the 4-stroke mechanical engine’s wheel that was derived in FIG. 8 (F-H). The latter derivation followed all the same steps as in case of economic regulation and is described in the Supplementary Material in more detail. FIG. 8 (E) reveals functional-archetype similarities across these different systems. While these archetypal patterns may be difficult to characterize individually, together they describe an optimally functioning system. Alternative transformation sequences may still allow system function, but only at suboptimal levels.

Further insight into the system’s optimization may be gained through analyzing similarities between the positive (balanced, constructive) and negative (exaggerated, destructive) aspects of these steps. FIG. 9 shows the averaged similarities over all aspects, as obtained by Claude 3.5 Sonnet.

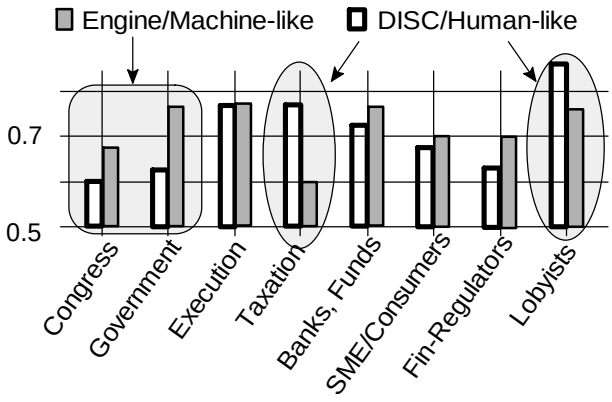

FIG. 9. Comparison of averaged similarities to reference components' parameters

It suggests that functions of Congress and Government resemble more machines than humans, while controlling organs (taxation, licensing, compliuance) and lobbyists are more like humans than machines. Such comparison is just exemplary, as the similarity indices are quite sensitive to the context (provided in the Supplementary Material at the end of manuscript). Yet, they help us to think about the differences between the natural/living and artificial/dead systems, optimal *vs*. suboptimal, and eternal *vs*. temporary.

Why is it that economy brings us to crises and wars, and complementarity between its various segments and organs is so difficult to achieve? Why are artificial engines so inefficient compared to living organisms that can work and regenerate under nearly any conditions without devastating natural environment?

It seems obvious that any entity that is not fully complementary within itself cannot be fully complimentary with other entities of comparable level. For instance, an artificial organ cannot fully complement the work of natural organs. An artificial intelligence cannot fully complement the natural intelligence. And artificial economy cannot fully complement natural societies and economies. The whole distinction seems to lay in the Golder Rule principle – how thoroughly each system, each player within a system, follows his obligation of treating his obstacle as a guiding teacher, breaking all game theories that advice to act selfishly. In a long run, all game theories are not sustainable, as they consume energy just to exist, while Golden Rule preserves and generates new energy through creating new existential dimensions and formally yielding $1 + 1 > 2$. The whole is greater than the sum of parts. That's the secret to any type of true success.

7. Conclusion

Our analysis shows how dialectical synthesis bridges a critical gap between morality and rationality, and how local decisions affect the whole system. It suggests that artificial systems will ultimately evolve toward natural ones, either through adaptation or replacement with more sustainable alternatives. Our current drive toward artificial advancement neglects its essential opposites – preservation of traditional values, natural systems, and native human intelligence. Following the core principle of dialectics, we must first appreciate and cultivate the positive aspects of what exists to achieve meaningful innovation. Therefore, true technological advancement requires first developing our natural abilities that are independent of technology.

Think of "smart gardeners" who maintain their own paradise gardens while participating in the global economy through remote services. They don't chase Mars colonies or erode nature - they find fulfillment through inner growth and limitless intellectual/spiritual journeys. In this vision, AI and other technologies are "nice to have" tools, but not necessities. What's truly necessary is family, a flourishing garden, and a cosmic-sized mission. All of this is enabled through a dialectical thinking that fosters synthesis between oneself and opposition, between rationality and mysticism, mind and heart, particular and whole. If dialectical wheels will be accepted, then we will guarantee that conflicts and violence will be reduced, while our self-awareness and technological optimization will be increased. All systems and technologies must serve just as accelerating means to bring our thinking to a new level.

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Supplementary Material (Dialectical Ethics for Systems Optimization

AI Prompt for estimating the "Goodness" value (G) in Table 3: "Consider this Table (provided independently). Estimate the numeric extent G to which a given concept or thesis T (from the 1st column) is aligned by average person or society in general with the positive side of its antithesis A+ (from the 4th column). G varies from 0 to 1, where G = 0 means that T is commonly equated to its risks T- and/or A- (from column 3), while G = n1 means that T is commonly equated to obligation A+ (from the 4th column). Your task is to find the best intermediate values between 0 and 1 for each concept T."

TABLE S1. Prompts used for deriving Table 5 with Claude 3.5 Sonnet.

Step 1: Identify the 4 major concepts, stages, or steps of the complex economic regulation process, that often leads to unexpected outcomes, arranged in the circular causality sequence (T1 – T2 – T3 – T4), so that T1 and T3 represent some type of conceptual or functional oppositions, while T2 and T4 represent another type of similar oppositions
Step 2: Identify the major positive and negative (exaggerated) sides of each stage (1-2 words each): T1 = Policy Planning, T2 = Implementation, T3 = Market Response, T4 = Adaptation
Step 3: Identify oppositions / antitheses (A) to each of the following stages or concepts of the market control cycle (T), so that A should not coincide with the remaining stages/concepts, and the positive side of the stage (T+) should be negative side of its opposition (A-), while the negative side of stage (T-) should be positive side of its antithesis (A+): (1) T1 = Policy Planning, T1+ = Foresight, T1- = Overplanning. (2) T2 = Implementation, T2+ = Execution, T2- = Overregulation. (3) T3 = Market Response, T3+ = Self-organization, T3- = Volatility. (T4) T4 = Adaptation, T4+ = Flexibility/Resilience, T4- = Inconsistency. The opposing pairs must be placed strictly diagonally on the wheel of circular causation, separated by 3 other steps, while maintaining the actual causality: (1) The opposition of T1 must be either between either T2 and T3 or T3 and T4. (2) The opposition of T2 - between either T3 and T4 or T4 and T1. (3) The opposition of T3 - between either T4 and T1 or T1 and T2. (4) The opposition of T4 - between either T1 and T2 or T2 and T3.

Step 4: Suggest the real names to these processes: (1) How do you call the "Emergent Behavior" between either Implementation and Market Response or Market Response and Adaptation, with positive side = Natural Flow, negative = Lack of direction? Can it be some kind of economic or regulatory phenomena? (2) How do you call the "Experimentation" between either Market Response and Adaptation or Adaptation and Policy Planning, with A+ = Learning, A- = Inefficiency? (3) How do you call the "Control Framework" between either Adaptation and Policy Planning or Policy Planning and Imp[lamentation, with A+ = Stability, A- = Stagnation? (4) How do you call the "Standardization" between either the Policy Planning and Implementation or Implementation and Market response, with A+ = Consistency, A- = Inflexibility?
Step 4A: Find the best matches of these antitheses with the real-life players and phenomena (1-3 words for each), e.g.: A1 = Market Forces - can these be the Major Banks and Corporations? A2 = Regulatory Feedback - Central Bank & other planning institutions? A3 = Governance Structure - Bureaucratic machine, ministerial structure? A4 = Regulatory Standards - Taxation structure?
Step 5: Which of the following causal sequences is the most realistic (keeping in mind that the final step cycles back to the first step): 1) T1 - T2 - T3 - T4 - A1 - A2 - A3 - A4; 2) T1 - T2 - T3 - A4 - A1 - A2 - A3 - T4; 3) T1 - T2 - A4 - T3 - A1 - A2 - T4 - A3; 4) T1 - T2 - A3 - A4 - A1 - A2 - T3 - T4; 5) T1 - A4 - T2 - T3 - A1 - T4 - A2 - A3; 6) T1 - A3 - T2 - A4 - A1 - T3 - A2 - T4; 7) T1 - A3 - A4 - T2 - A1 - T3 - T4 - A2; 8) T1-A2-A3-A4-A1-T2-T3-T4. For each sequence estimate the numeric probabilities (0 to 1) regarding its realistic existence, assuming that: T1 = Economic Policy Planning; T2 = Policy implementation; A3 = Executive Government (Ministries, etc); A4 = Taxation, Licensing, Compliance; A1 = Major Market Players (Major Banks, Funds, Corporations); A2 = Strategic Planning Bodies (Central Bank, Economic Council, Financial Regulators); T3 = Market Response; T4 = Policy Adaptation
Step 5A: Find the best matches of the original concepts T1-T4 with the real players in the market, legislation, governmental bodies, and other bodies or areas that may be pertinent to this analysis

Step 5B: Estimate similarities between (dialectical facet or character of) each stage of a given process vs. those of reference wheel(s)

Table S2. Derivation of the 4-Stroke Engine's Wheel in FIG. 8(F-H). The major steps of a cyclic process involve air-fuel mixture intake (T1), compression (T2), combustion (T3), and exhaust (T4). Note the increasing oppositions between the differently signed diagonal components in the original pairs (T1-T3 and T2-T4) and subsequent pairs (T1-A1, T2-A2, …). For instance, T1+ = Efficiency is more opposite to the A1- = Inefficiency and Blowby/Jamming than to T3- = Heat.

Starting Conc	**T1 (position 1)**	**T2 (position 2)**	**T3 (position 4)**	**T4 (position 7)**
4-stroke engine	Intake	Compression	Combustion	Exhaust
Positive	Efficiency	Power	Force	Cleansing
Negative	Clogging	Stress	Heat	Back-pressure
Antitheses	**A1 (position 5)**	**A2 (position 6)**	**A3 (position 8)**	**A4 (position 3)**
Antitheses	Release	Relaxation	Preparation	Containment
Positive	Unclogging	Relief	Cooling	Preservation
Negative	Inefficiency	Weakness	Inertia	Contamination
Real stages	Power stroke	Valve overlap	Charge format.	Ignition delay
Positive	Work Output	Exhaust scaveng.	Homogenization	Adjusted timing
Negative	Blowby/Jamming	Charge dilution	Poor mixing	Knock
Sync Factors	T1 – A1	T2 – A2	T3 – A3	T4 – A4

Existing	Variable valve timing (VVT); Intake manifold tuning	Camshaft phasing; Variable compression ratio	Multi-stage fuel injection; Exhaust gas recirculation (EGR)	Direct injection; Turbulence-inducing pistons
Desired	Adaptive intake geometry?	?	Plasma-assisted ignition; Smart exhaust valves	In-cylinder fuel reforming; Adaptive combustion chamber

TABLE S2. Estimated similarities between steps of independent wheels (using Claude 3.5 Sonnet) that were used in construing FIG. 9. Similarities are numbers in parentheses.

N	**Real Players**	**DISC Traits (B)**	**4-Stroke Engine**	**D-E**[a)]
1	T1 = Congress, Partisan think tanks	Influence (0.7)	Intake (0.6)	(0.5)
(+)	Foresight	Charismatic (0.6)	Efficiency (0.7)	(0.6)
(-)	Rigidity	Impulsive (0.5)	Clogging (0.7)	(0.5)
2	A3 = Gov. ministries, agencies, bodies	Dynamism (0.6)	Compression (0.8)	(0.8)
(+)	Institutional consistency	Initiative (0.5)	Power (0.7)	(0.7)
(-)	Bureaucratic inertia	Instability (0.8)	Stress (0.8)	(0.8)
3	T2 = Gov. action, policy execution	Dominance (0.8)	Ignition delay (0.7)	(0.6)
(+)	Execution	Leadership (0.8)	Controlled timing (0.8)	(0.7]

(-)	Overregulation	Aggression (0.7)	Pre-ignition/knock (0.8)	(0.8)
4	A4 = Taxation, Licensing, Compliance	Conscientious (0.8)	Combustion (0.6)	(0.7)
(+)	Predictable rules	Precision (0.8)	Force (0.6)	(0.8)
(-)	Bureaucracy	Perfectionism (0.7)	Heat (0.6)	(0.6)
5	A1 = Large banks, Funds, Corporat.	Objectivity (0.7)	Power stroke (0.8)	(0.6)
(+)	Efficient allocation	Rationality (0.8)	Work Output (0.8)	(0.7)
(-)	Market failures	Detachment (0.7)	Blowby/Jamming (0.7)	(0.7)
6	T3 = Small/Medium Enterpr., consumers	Steady (0.7)	Valve overlap (0.6)	(0.8)
(+)	Innovation	Reliability (0.6)	Exhaust scavenging (0.7)	(0.7)
(-)	Volatility	Passivity (0.7)	Charge dilution (0.8)	(0.8)
7	A2 = Central Bank, Economic Council, Fin. Regulators	Collaboration (0.7)	Exhaust (0.6)	(0.5)
(+)	Evidence-based policymaking	Harmony (0.6)	Cleansing [0.7]	(0.8)
(-)	Trial and error costs	Submissive (0.6)	Back-pressure/ Pollution (0.8)	(0.7)

8	T4 = Lobbyists, Biz-networks	Flexibility (0.8)	Charge formation (0.7)	(0.7)
(+)	Flexibility Resilience	Adaptability (0.9)	Homogenization (0.8)	(0.8)
(-)	Opaque, Not transparent	Chaos (0.8)	Poor mixing (0.8)	(0.7)
	Average Similarity	(0.7)	(0.7)	(0.7)

[a)] Similarity between the DISC and Engine's steps