

A Mathematical Theory of Organization

DSRP as Universal Code of Mind and Nature for Organizing, Evolving, and Understanding Information

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ABSTRACT: Understanding and aligning our thoughts with reality is a challenge we all face. This paper introduces DSRP (Distinctions, Systems, Relationships, Perspectives) as a simple yet powerful framework to help bridge the gap between how we think and how the world really works. By using DSRP, we can better organize and make sense of information, improving our ability to solve problems and make decisions. This approach isn't just for scientists—it's a tool anyone can use to enhance their thinking. The paper shows how DSRP works in both our minds and in nature, providing practical examples and evidence of its effectiveness. Whether you're tackling everyday challenges or complex issues, understanding DSRP can help you see the world more clearly and think more effectively.

KEYWORDS: DSRP | universality | mental models | mind & nature | reality bias | metacognition

Introduction

Imagine you have a friend who sends you a secret message using a special code. To understand the message, you need to know how to decode it. In a similar way, the world around us—which we can generally call “Reality”—acts like your friend, a source that transmits information using a special code. Our human minds are like receivers that need to decode this information to understand it. Learning about the secret code that Reality uses to send its messages would give us a significant advantage in understanding the world better and making smarter decisions. How can we better align our thinking with reality?

The problem of accurately reflecting reality in one's mental models is known as *epistemic accuracy* or *epistemic reliability*. This concept focuses on the alignment between our mental representations and the actual state of the world (“Reality”). In science and philosophy, this issue is often discussed within the framework of several key areas. Firstly, epistemology (the study of knowledge and justified belief) explores the nature, scope, and limits of human understanding and the accuracy of mental models. Secondly, model theory in logic and mathematics ensures that models accurately represent the structures they are intended to describe. Thirdly, in cognitive science, the focus is on processes like perception,

learning, and reasoning, examining how closely mental models (cognitive representations) align with external reality. Additionally, in research methodology, the concept of construct validity is crucial. Construct validity concerns the degree to which a test or instrument accurately measures the theoretical construct it is intended to measure. Ensuring construct validity is essential for maintaining the alignment between conceptual understanding and empirical reality, thereby enhancing the overall epistemic accuracy of the research findings. Similarly, in everyday life, common sense often brings a similar problem: the challenge of making sure our beliefs and understandings accurately reflect the actual situations we face. Just as in science, this requires continuous testing and adjusting of our perceptions and assumptions. As Einstein said, “the whole of science is nothing more than a refinement of everyday thinking.” This quote emphasizes that scientific methods and concepts build upon the intuitive and practical ways people understand and interact with the world in their daily lives. It reflects Einstein's view that science, at its core, is an extension and improvement of the common-sense thinking that everyone uses.

How can we better align our thinking with reality? This paper proposes that there is a code shared by both the mind (thinking) and nature (reality) and that awareness and practice of this code (metacognition) can increase alignment. DSRP is this code. DSRP is a universal theory of organization of everything in both mind and nature. While this code manifests in nature itself, for humans, it manifests most directly in our thinking (cognition)—our attempts to make mental models, meaning, or sense of our world. Awareness of our thinking, or *metacognition*, is therefore synonymous with awareness of DSRP. Awareness of this ‘thinking’ code (metacognition) is a significant advantage, and research shows that metacognition leads to corollary success in all domains [1,2]. DSRP is therefore foundational and universal to all “types” of thinking. As such, DSRP is a useful tool both to *do* the many types of thinking, and also *avoid* common biases or pitfalls associated with them:

Common Sense, Critical Thinking, Emotional Intelligence, Creative Thinking, Growth Mindset, Design Thinking, Leadership Thinking, Problem Solving Thinking, Strategic Thinking, Systems Thinking, Analytical Thinking, General Intelligence, Interpersonal Intelligence, Intrapersonal Intelligence, Grit, Resilience, Anti-fragility, Scientific Thinking, Fast/Slow Thinking, Convergent/Divergent Thinking, Lateral Thinking, Reflective Thinking, Abstract Thinking, Inductive Thinking, Deductive Thinking, Situational Thinking, Clear Thinking, Complexity Thinking, Ecological Thinking, Adaptive Thinking, Enterprise Thinking, Thinking Like a Scientist, Synthetic Thinking, Interdisciplinary Thinking, Prosocial Thinking, Bias.

What this means is that these types of thinking are outputs not inputs. In other words, DSRP are the *inputs* that create the emergent property (outputs) of all of these types of thinking. ‘Types’ of thinking tend to focus on the results, outcomes, or ending points, rather than the inputs, simple rules, or starting point. It is common in complexity science to describe the emergent properties of certain rule sets as “gotten for free” because they are the results you get when certain inputs are utilized. It means that if you become aware of, and practice DSRP patterns of thinking, you get these other 38 types of thinking for free.

The results of the research and topics discussed in this paper are both theoretical and ultimately pragmatic in nature. As Lewin [3] said, “There is nothing more practical than a good theory.” Thus, I have

utilized both the pinpoint accuracy of mathematics and provided rich descriptions so that anyone of any background can read, understand, and most importantly, benefit from this work.

Evidence of Existence & Effectiveness of DSRP

The DSRP patterns are not only observable in human cognition but also in natural phenomena, indicating their universal applicability as a bridge between the real world and our mental representations of it.

Existence | Mind

Research in cognitive science and psychology provides evidence of DSRP patterns in human thinking [4–9]. Studies on problem-solving and cognitive development show that individuals who utilize DSRP Patterns exhibit significantly higher levels of cognitive complexity, systems thinking, and problem solving ability [10,11]. In addition, research shows that the general public—likely due to training and enculturation—are susceptible to many errors of thinking and biases that are resolved by DSRP [12].

Existence | Nature

In “nature” (a.k.a, reality, the universe, physical matter, etc.), DSRP patterns can be observed in biological systems, ecological interactions, and physical processes. For example, the distinction between different species, the systemic interactions within an ecosystem, the relationships between predator and prey, and the varying perspectives of organisms in an environment all reflect the underlying structures of the DSRP patterns in nature [13]. Indeed, even when one challenges the most abstract of DSRP’s many predictions (e.g., that unconscious, physical objects, such as plants and atoms, have a point of view), one finds empirical evidence, for example, that plants [14,15] and even single atoms [16,17] take perspective.

Effectiveness in Problem Solving, Systems Thinking, and Cognitive Complexity

Empirical studies have demonstrated that applying the DSRP enhances problem-solving abilities, fosters a deeper understanding of complex systems, and increases cognitive complexity. These findings suggest that DSRP not only reflects how we naturally think and understand the world, but also provides *a method to improve* these cognitive processes [10,11].

DSRP as a Synergetic Structure

DSRP accommodates multiple, interacting dimensions of thought, offering a more nuanced and flexible approach to understanding complexity. DSRP (Distinctions, Systems, Relationships, Perspectives) functions as a synergetic structure, meaning that its elements interact in ways that create outcomes greater than the sum of their parts [9]. Each element of DSRP is inherently interlinked with the others, creating a dynamic and comprehensive model for organizing and understanding information. For instance, making a distinction (D) requires systems (S), relationships (R), and perspectives (P) because a single distinction is a whole made up of related parts, each with their own point and view. Similarly, recognizing any part of a whole (S) requires making identity-other distinctions (D); implies a relationship (R) between the part and whole and implies relations to other parts, and also implies that there are different view-points (P). This interdependence among the patterns means that the effectiveness of DSRP arises from the combined use

of all its components, leading to enhanced cognitive capabilities and deeper insights. The synergetic nature of DSRP allows it to address complex problems more effectively, fostering a holistic and interconnected approach to thinking that surpasses what could be achieved by considering distinctions, systems, relationships, or perspectives in isolation. As shorthand for what follows, we use the term “DSRP-483,”¹ because at its core the DSRP Theory postulates 4 Patterns of Organization, made up of 8 Elements, which are animated by 3 dynamics. Table 1 captures the 483 structure and dynamics of DSRP Theory:

4 Organizing Patterns	Equality Dynamic	4 Visible Elements	Co-implication Dynamic	4 Invisible Elements
Distinctions (D)	=	identity (i)	$\Leftrightarrow$	other (o)
Systems (S)	=	part (p)	$\Leftrightarrow$	whole (w)
Relationship (R)	=	action (a)	$\Leftrightarrow$	reaction (r)
Perspectives (P)	=	view (v)	$\Leftrightarrow$	point (p)

*Simultaneity Dynamic

Table 1: DSRP Structure and Dynamics

DSRP Table Explained

- 483: 483 Refers to the 4 Patterns of Organization (DSRP), their 8 Elements (*iopwarvp*), and their 3 Dynamics ($=\Leftrightarrow *$).
- The 4 Organization Patterns (DSRP): There are four ways we organize information into meaning. We: define Distinctions, sort Systems, recognize Relationships, and take Perspectives. This is called DSRP.
- The Equality Dynamic (=): The Equality Dynamic states that each pattern of organization is equal to two coimplying elements. This means, for example, that when we say Distinction, we are referring to both of these coimplying elements.
- The 8 Organizing Elements (*iopwarvp*): The 8 Elements are made up of four tangible and four intangible elements. The visible and invisible refers to the tendency for them to be acknowledged more or less in one’s thinking but is not an indication of their importance. The 8 elements are *iopwarvp*.

¹ The need to clarify DSRP with the more specific naming convention, DSRP-483, arises from common criticisms that misinterpret the theory. Critics often create a strawman argument by either (a) relying solely on the dictionary definitions of the words distinctions, systems, relationships, or perspectives, or (b) treating DSRP as four separate, static categories into which ideas can be placed. DSRP-483 addresses these misconceptions by emphasizing the definitions and dynamics as set forth by the theory, highlighting that DSRP is a dynamic process rather than a set of static categories. As a naming convention, DSRP-483 captures the intricate and interconnected nature of these elements, showing how they operate in a continuous and evolving manner. Furthermore, DSRP-483 specifies the definitions of distinctions, systems, relationships, and perspectives, differentiating them from standard dictionary definitions, that are not sufficiently detailed to convey the complexity and dynamism inherent in DSRP theory.

- The Co-implication Dynamic ($\Leftrightarrow$): The Co-implication Dynamic states that if one element exists, the other element exists. This is extremely important because it tells you that the opposing element exists whether or not you or others recognize it, see it, or acknowledge it. This rule is critically important in making predictions about the world.
- The Simultaneity Dynamic ($*$): The Simultaneity Dynamic or the “Eightfold Path” states that anytime an element exists, it also exists simultaneously as any of the other 7 elements. This rule is often misinterpreted to mean that one must therefore consciously recognize all of those paths, which is not the case. This rule is critically important in making predictions about the world, but also realizing how little of the world your thinking models actually capture.
- $=\Leftrightarrow*$: “If you know, you know...” This saying means that if you understand the 3 Dynamics of DSRP (Equality ($=$), Coimplication ($\Leftrightarrow$), and Simultaneity ($*$)) then you understand something few people do and as a result, you likely see the world in a completely different and revealing way.

Mathematical Representation

$$O = DSRP = \{(i \leftrightarrow o), (p \leftrightarrow w), (a \leftrightarrow r), (v \leftrightarrow \dot{p})\}$$

Where, *Organization* (O) refers to the structure of information, where each element is defined through co-implication ($\leftrightarrow$) with its counterpart. *Distinctions* (D) are defined as identity (i) co-implicated with other (o), meaning that understanding what something is inherently involves understanding what it is not and vice versa. *Systems* (S) are defined by *part* (p) co-implicated with *whole* (w), indicating that recognizing a part requires acknowledging the whole it belongs to and vice versa. *Relationships* (R) are defined by *action* (a) co-implicated with *reaction* (r), reflecting that any action implies a corresponding reaction and vice versa. *Perspectives* (P) are defined by *view* (v) co-implicated with *point* ($\dot{p}$), signifying that any perspective encompasses both a point (observer) and a view (observed). This interconnected structure allows DSRP to comprehensively organize and analyze information with great efficiency and effect.

The 3 Dynamics of Information

1. Equality

Each DSRP pattern is essential for organizing or structuring information

$$D = (i \leftrightarrow o)$$

$$S = (p \leftrightarrow w)$$

$$R = (a \leftrightarrow r)$$

$$P = (v \leftrightarrow \dot{p})$$

$$O = \{D, S, R, P\}$$

In DSRP, the organization or structure of information (O) requires the presence of all four patterns: Distinctions (D), Systems (S), Relationships (R), and Perspectives (P). Each pattern is equally essential, meaning that effective information organization cannot occur without incorporating all these elements. For example, a complex concept in any field must involve making distinctions, understanding systems, recognizing relationships, and considering different perspectives to be fully comprehended.

2. Co-implication

The existence of one element implies the existence of its pair

$$\begin{aligned} D &= i \leftrightarrow o = (i \implies o) \wedge (o \implies i) \\ S &= p \leftrightarrow w = (p \implies w) \wedge (w \implies p) \\ R &= a \leftrightarrow r = (a \implies r) \wedge (r \implies a) \\ P &= v \leftrightarrow \dot{p} = (v \implies \dot{p}) \wedge (\dot{p} \implies v) \end{aligned}$$

Where ($\leftrightarrow$) denotes co-implies, ($\implies$) denotes implies, and ($\wedge$) denotes AND, indicating that both A and B must be true for the expression to be true.

Each of the DSRP patterns consists of paired elements that co-implicate each other. This means the presence of one element inherently implies the presence of its corresponding pair.

- Distinctions (D): Identifying an identity (i) implies recognizing what it is not (o) and vice versa.
- Systems (S): Recognizing a part (p) implies it is part of a larger whole (w) and vice versa.
- Relationships (R): Observing an action (a) implies a corresponding reaction (r) and vice versa.
- Perspectives (P): Considering a view (v) implies the existence of a specific point ($\dot{p}$) that manifests that view, and vice versa.

This co-implication ensures that any piece of information is inherently structured by the mutual existence of these paired elements, reinforcing the interconnected nature of DSRP patterns.

3. Simultaneity

Any bit of information is *simultaneously* all of the DSRP elements. The dynamic of simultaneity in DSRP means that any single piece of information inherently contains aspects of all 8 DSRP elements at the same time, such that:

$$I(t) = \{D(i, o), S(p, w), R(a, r), P(v, \dot{p})\}$$

Where $I(t)$ represents a bit of information at time t . This formula captures the idea that any single piece of information is not limited to one pattern but simultaneously exhibits distinctions, systems, relationships, and perspectives, providing a holistic and integrated understanding. We can think of this as being two-fold: *what* information exists and *how* the information is organized. It is important to distinguish between the rule of co-implication and simultaneity. Co-implication simply states that any information content, say ERF, occupying any of the organizational structural elements of DSRP implies its

opposite element exists, for example not-ERF. Whereas simultaneity states that if ERF exists (identity), ERF itself is also simultaneously existing as a part of some larger whole as well as a whole containing parts. In other words, simultaneity rule predicts that ERF will not only be an ERF-identity, but also an ERF-other, ERF-part, ERF-whole, ERF-action, ERF-reaction, ERF-point and ERF-view. Whereas co-implication rule predicts something quite different: that if ERF-part exists a whole must therefore exist that contains ERF-part.

The Evolution of Information

A mental model (M) is a function of the interaction between information (I) and organization (O). In other words, the quality and structure of the mental model depend on both the information content and how that information is organized:

- I : Information, the raw data or content.
- O : Organization, which in this context is understood as DSRP patterns (Distinctions, Systems, Relationships, Perspectives).

The information at a given time ($I(t)$) is a function of its organization (O). If we substitute O with DSRP, it means the information we perceive and understand at any time is structured by the DSRP patterns:

- $I(t)$: Information at time t .
- $f(O)$: Function representing how the information is structured by O (DSRP).

The simplified equation $I = f(O)$ captures the more detailed $I(t+1) = f(I(t), DSRP)$ explaining how any bit of information (I) at time (t) is structured by the universal patterns of DSRP (O), and how this information evolves over time through the function (f) that integrates these patterns. Thus, $I = f(O)$ explains that information (I) is a function of its organizational structure (O), which is defined by the patterns of Distinctions, Systems, Relationships, and Perspectives (DSRP). *This evolution of information characterizes not only how information is organized and evolved in human sensemaking and learning but also how physical matter (as a medium for information) organizes and evolves.* Thus,

$$\begin{aligned} I(t+1) &= f(I(t), DSRP) \\ I(t+1) &= f(I(t), O) \\ I &= f(O) \end{aligned}$$

Where (f) is a transformation function representing the interaction and evolution of information based on DSRP patterns. In this view, the mental model $M(t)$, at any time t is a function of the information structured by DSRP (O) and the continuous application of these patterns. This highlights that DSRP is both the method for organizing information and the ongoing process that shapes our mental models. Information evolves over time based on the dynamics of DSRP:

$$I(t+1) = f(I(t), DSRP)$$

Of course, meaning making is a continuous process of information organization and refinement over time. We can express the rate of change of information with respect to time as a function of the current information and the DSRP organizational patterns.

$$\frac{dI(t)}{dt} = f(O, I(t))$$

Here, $\frac{dI(t)}{dt}$ represents the rate of change of information over time, and $f(O, I(t))$ represents the organizational process that structures the information. In the initial condition at $t = 0$, we have some initial information $I(0)$. The differential equation thus describes how the information changes over time based on the DSRP organizational patterns O and the current state of information $I(t)$. To find the information at any time t , we integrate the differential equation:

$$I(t) = I(0) + \int_0^t f(O, I(\tau)) d\tau$$

Where integral $\int_0^t$ represents the accumulation of changes in information over the time interval from 0 to t . The function $f(O, I(\tau))$ describes how the information changes over time, considering both the organization (O) and the information at each specific time (τ). $d\tau$ denotes an infinitesimal increment of time, over which the function $f(O, I(\tau))$ is integrated. This integration sums up the effects of these small changes from time 0 to time t , showing how the information evolves continuously.

The integration process captures the idea that the output at each moment becomes the input for the next, as it continuously accumulates the changes. It succinctly captures the dynamic nature of information structuring and emphasizes the ongoing interaction between information and organization. By integrating this equation, we obtain the information at any given time, demonstrating how the process evolves continuously. This is the process of continuous learning.

Forming Mental Model is Organizing Information

The equations $M = IO$ and $I(t) = f(O)$, where $O = DSRP$ represent different aspects of the relationship between mental models and information structuring. To reconcile these two equations, we need to understand that they are describing interconnected aspects of the same process:

Mental Model Formation: This describes the broader process where a mental model is formed by the interaction of information and its organization. It emphasizes that both the content of information and the way it is organized (using DSRP) are crucial for constructing a coherent mental model. We can think of $M = IO$ as describing the noun-form of mental models

Information Structuring: This describes how information at any given time is perceived and structured through the application of DSRP patterns. It highlights that the structure provided by DSRP is essential

for interpreting and understanding information. We can therefore think of $I(t) = f(O)$ as describing the verb- of how we form mental models.

The mental model (M) is the outcome of applying the DSRP organizational structure (O) to the information (I). At any given time, the information ($I(t)$) we perceive and use is structured by DSRP (O). Therefore, the mental model (M) can be viewed as a dynamic entity that evolves as new information ($I(t)$) is continually processed through DSRP patterns (O). We can integrate these ideas into a coherent integrated formula:

$$\begin{aligned} M(t) &= I(t) \cdot O \\ I(t) &= f(O) \end{aligned}$$

So, combining the two equations, we get:

$$\begin{aligned} M(t) &= f(O) \cdot O \\ M(t) &= I(t) \cdot O \end{aligned}$$

Or simplified,

$$M = IO$$

This is critically important, as it conveys the basic process for *individual human learning* (L_{ind})—any change in a mental model ($L_{\text{ind}} = \Delta M$); as well as *organizational learning* (L_{org}) where the change in the mental model is shared among agents ($L_{\text{org}} = \Delta M \cdot \alpha$); as well as *culture* which is a mental model shared by a set of agents ($C = M \cdot \alpha$).

$$\text{Individual Learning} \quad L_{\text{ind}} = \Delta M$$

$$\text{Organizational Learning} \quad L_{\text{org}} = \Delta M \cdot \alpha$$

$$\text{Culture} \quad C = M \cdot \alpha$$

Where ΔM represents the change in the mental model and α represents the sharing factor or the extent to which the mental model is shared among agents.

Thus, DSRP elucidates how mental models are formed individually, how they evolve, and can be shared by multiple agents often in hope of building a shared mental model that predicates action.

Reality Encodes, Human Decodes

Claude Shannon's communication theory fundamentally explains how information is transmitted from a sender (transmitter) to a receiver. In this process, the transmitter encodes a message into a signal using a specific code, which is then sent through a communication channel to the receiver. The receiver decodes the signal back into the original message. For efficient communication, the transmitter and receiver *must* share a common code to ensure the message is accurately encoded and decoded. In the context of reality,

nature, or the material universe acts as the transmitter. It constantly broadcasts signals that tell us about its properties and behaviors. Our minds—born in, and of—nature and integrally connected to it, serve as the receivers of these signals. However, our minds often only subconsciously know and use the code of nature, as we are often unaware of it consciously. This lack of conscious awareness (metacognition) hinders our ability to quickly and accurately decode the messages reality sends, leading to misunderstandings and errors. *When we become consciously aware of the code our minds and nature use—through metacognition—we can decode reality's messages more efficiently and accurately.*

DSRP (Distinctions, Systems, Relationships, Perspectives) represents the code that reality uses to organize itself. By understanding and applying DSRP, we better align our mental models with the structure of reality, enhancing our ability to interpret and respond to the world around us. Let's consider DSRP as the code for encoding and decoding the message using Shannon's communication theory, which can draw parallels between the components of DSRP and the elements of Shannon's model.

Shannon's Communication Model:

1. **Source:** Origin of the message (reality/nature).
2. **Transmitter:** Encodes the message into a signal (nature organizing itself through DSRP).
3. **Channel:** Medium through which the signal is sent (environment/experience).
4. **Receiver:** Decodes the signal back into a message (human mind).
5. **Destination:** Final recipient of the message (understood knowledge).

Shannon's communication theory can be represented mathematically as:

$$H(X) = - \sum p(x) \log p(x)$$

Where $H(X)$ is the entropy (uncertainty) of the source message, and $p(x)$ represents the probability of each possible message x . Table 2 explains the three steps in Shannon's Communication theory combined with DSRP Theory to explain the mental representation of Reality.

ENCODING PROCESS

Source $\mathbb{R}$: Reality/Nature organizes itself through DSRP

Transmitter $\mathbb{R}'$: Information about how reality is organized is encoded into a signal

Distinctions: $D(i, o)$ Identifying elements of the message and differentiating them

Systems: $S(p, w)$ Structuring the message into parts and wholes

Relationships: $R(a, r)$ Encoding interactions (actions and reactions) within the message

Perspectives: $P(v, \dot{p})$ Relaying multiple viewpoints in the message

$$\mathbb{R}(t) = \{D(i, o), S(p, w), R(a, r), P(v, \dot{p})\}$$

Where we distinguish M *mental model*, from two other similar but different variables: $\mathbb{R}$ denotes “Reality,” and $\mathbb{R}'$ (used below) denotes the *message*. Thus, $\mathbb{R}'(t)$ is the message at time t .

TRANSMISSION THROUGH THE CHANNEL

Channel (Environment/Experience)

The encoded message $\mathbb{R}'(t)$ is sent through the channel, influenced by external noise and distortions caused by our environment and experience.

DECODING PROCESS

Receiver (Human Mind)

Receives the encoded message $\mathbb{R}'(t)$

Applies DSRP to decode the message:

Distinctions: $D(i, o)$ Identifying elements of the message and differentiating them

Systems: $S(p, w)$ Understands the parts and wholes of the message

Relationships: $R(a, r)$ Recognizes interactions (actions and reactions) within the message

Perspectives: $P(v, \dot{p})$ Considers multiple viewpoints in the message

$$I(t+1) = f(I(t), DSRP)$$

Where $I(t+1)$ is the decoded information at time $t+1$. *The efficiency of decoding the message depends on the receiver's ability to consciously use DSRP.* When the receiver (human mind) is aware of DSRP, the decoding process becomes more efficient and accurate. We can simplify the equation above to show that information is a function of organization, or DSRP.

$$I = f(O)$$

Table 2: Shannon's Communication Theory and DSRP Theory

Integrating DSRP with Shannon's communication theory shows that Reality (the transmitter) encodes messages using DSRP patterns, and our minds (the receivers) decode these messages by consciously understanding and applying DSRP. We can therefore decode the messages from reality more efficiently and accurately, aligning our mental models with the structure of the physical world.

Given that DSRP (Distinctions, Systems, Relationships, Perspectives), encodes any information I as being organized (O) through 8 simultaneous states: identity (i), part (p), action (a), view (v), other (o), whole (w), reaction (r), and point ($\dot{p}$). Each of these states can either be present (1) or absent (0) in the organization. To express this idea mathematically, we'll incorporate the concepts of information entropy and the way information is organized through these states. Given that each state is either present or absent:

$$I(t) = \sum_i b_i x_i$$

where b_i is 1 if state x_i is present, and 0 if absent. Thus,

$$I(t) = \sum_{i=1}^8 b_i x_i$$

where $x_i \in \{i, p, a, v, o, w, r, \dot{p}\}$ and $b_i \in \{0, 1\}$.

This shows that information is encoded and decoded based on the way it is organized through 8 simultaneous states. The entropy formula demonstrates the information content, while the organization equation shows how information is structured by DSRP elements.

Love Reality

The goal of all thinking or mental models is to achieve alignment with Reality. Our mental models (unconscious and conscious) drive our emotions, predictions, decisions, actions, and expectations. When our mental model is *aligned* with the small slice of Reality to which it corresponds, things *work* out the way we expect them to, the way we planned. When our mental model is *out of alignment* with Reality, things *do not work* out the way we expect or planned. Thus, the implicit goal of all mental representations, or thinking, is to achieve as much alignment as possible with Reality. To achieve this we must incrementally improve our mental models over time ($M(t)$) and adapt and evolve them to fit Reality. This brings into play two of the most significant biases in human cognition:

1. **Reality Bias:** when we do not perceive that there is any distinction between mental models and Reality. We perceive that what we are experiencing and Reality are the same thing. Thus, Reality Bias is a case where the very notion of a mental model does not exist.
2. **Confirmation Bias:** When we fit Reality to our Mental Model rather than fitting our Mental Model to Reality

The moniker “Love Reality” was created to remind us of the most devastating bias—reality bias—which prevents us from recognizing the existence of the mental models that we build that are only approximations of Reality. Understanding this concept is central to metacognition. In this context, Reality refers to the material world. This material world remains in a pre-cognitive state, meaning it exists regardless of our awareness, and it continuously interacts with us. We encounter it and receive feedback from reality in the form of encoded messages or signals, which our minds must decode. Unless we purposefully recognize the veil of mental models through which we perceive reality, we may fail to see the critical feedback offered that will better align our mental models with reality itself.

Understanding Mental Models in Relation to Reality

To express the relationship between mental models, information, organization, and the Reality in which we all live, we can define and integrate these components into a comprehensive “big picture” model.

Definitions: Note the difference in double-strike capital letters $\mathbb{R}, \mathbb{I}, \mathbb{O}$ correspond to DSRP in nature (Reality) versus single-strike capital letters M, I, O which correspond to DSRP in the human mind (mental models).

- $M(t)$: Mental models at time t .
- I : Information content of mental models.
- O : DSRP Organization of mental models.
- $\mathbb{R}(t)$: Material world Reality at time t .
- $\mathbb{I}$: Information from the material world Reality.
- $\mathbb{O}$: DSRP Organization of material world Reality.

Mental Models as a Fraction of Reality

Our mental models ($M(t)$) are only a small representation of the vast and complex material world Reality ($\mathbb{R}(t)$). In other words, what we know about reality is infinitesimal when compared to what is possible to know. The fraction below emphasizes the limited nature of our mental representations compared to the full scope of Reality.

$$\frac{M(t)}{\mathbb{R}(t)}$$

Mental Model Formation

The equation below suggests that our mental model at time t ($M(t)$) are formed by the interaction of information (I) organized through DSRP (O), in relation to Reality at time t ($\mathbb{R}(t)$). This highlights the interplay between the information we process and how we structure it, recognizing the influence of the feedback we take in from Reality.

$$M(t) = \frac{I \cdot O\{D(i, o), S(p, w), R(a, r), P(v, \dot{p})\}}{\mathbb{R}(t)}$$

Information and Organization in Reality

$$\mathbb{R}(t) = \mathbb{I} \cdot \mathbb{O}\{D(i, o), S(p, w), R(a, r), P(v, \dot{p})\}$$

This indicates that the material world Reality ($\mathbb{R}(t)$) is composed of information ($\mathbb{I}$) which is also organized by DSRP patterns ($\mathbb{O}$). It suggests that the Reality itself can be understood as a combination of information and its DSRP organization. By integrating these concepts, we arrive at a unified formula:

$$M(t) = \frac{I \cdot O\{D(i, o), S(p, w), R(a, r), P(v, \dot{p})\}}{\mathbb{I} \cdot \mathbb{O}\{D(i, o), S(p, w), R(a, r), P(v, \dot{p})\}}$$

Where, the $I \cdot O$ in the numerator (top) represents our internal “mental model” of information (I) organized by the DSRP (O) and the $\mathbb{I} \cdot \mathbb{O}$ in the denominator (bottom) represents the total information and DSRP organization present in the material world Reality. Or simplified,

$$\frac{M}{\mathbb{R}}$$

$M/\mathbb{R}$ encapsulates the idea that our mental models ($M(t)$) are constructed and derive their meaning from applying organizational patterns (DSRP) to the information we perceive and receive, while recognizing that this process represents only a fraction of the complete Reality of the material world's information and organization. It highlights the dynamic interaction between our “internal” cognitive processes and the “external” world, emphasizing the role that aware, metacognitive application of DSRP can play as a bridge to increase the probability that our mental representations and the complexity of Reality are aligned.

Shannon's entropy is related to how well our mental models capture the complexity and uncertainty of Reality. Higher entropy requires more information to describe the state of the system. Our mental models aim to reduce this uncertainty by accurately capturing the relevant aspects of reality. Our mental models ($M(t)$) are constructed from the information we perceive and process. The fraction, $M(t)/\mathbb{R}(t)$ indicates the extent to which our models reflect the real world. As our understanding improves and our mental models become more accurate, this fraction approaches 1, meaning our models capture reality more comprehensively. Aspirationally then, the goal is to quite literally become 1 with reality.

$$\frac{M}{\mathbb{R}} = \frac{1}{1} = 1$$

The entropy of the information $H(X)$ is deeply related to the fraction of reality represented by our mental models in the equation:

$$M(t) = \frac{I \cdot O\{D(i, o), S(p, w), R(a, r), P(v, \dot{p})\}}{\mathbb{R}(t)}$$

This equation suggests that our mental models are formed by organizing the information (I) using DSRP (O) and that the completeness and accuracy of these models are relative to the total complexity of reality ($\mathbb{R}(t)$). The entropy $H(X)$ represents the uncertainty in the information we receive from reality ($\mathbb{R}(t)$). This information needs to be organized and interpreted to form our mental models. Higher entropy ($H(X)$) implies more complexity and information in Reality. As our mental models improve, they better approximate this complexity, reducing the discrepancy between $M(t)$ and $\mathbb{R}(t)$. In addition, the informational message we receive from Reality is also a function of the channel—the medium through which the signal is sent which includes numerous factors of our environment and our experience (which are themselves held in mental models). Thus, our existing Mental Models act as the channel. Ergo, the presence of metacognition—of DSRP organization and the biases it highlights—*while perceiving* decreases this entropy. Our mental models aim to capture and reduce the uncertainty represented by entropy, striving for a more accurate and complete representation of reality. DSRP helps structure and interpret this information, enhancing the fidelity of our mental models relative to the complexity of Reality.

Implications

A Physical-Cognitive Bridge

Table 3 illustrates how the fundamental DSRP (Distinctions, Systems, Relationships, Perspectives) patterns of thinking mirror the organizational schema of the natural world ($\mathbb{R}$). The cognitive examples highlight how our brains, evolved from the same material structures of nature, perceive and process information in ways that are inherently organized by DSRP. For instance, just as we make distinctions by recognizing cells, differentiate them from their environment, and recognize their reactions to stimuli, cells distinguish themselves, apprehend their identity (where they begin and end) and react to their surroundings. This shows that our thought processes are not isolated phenomena but are deeply rooted in the material organization of the universe. Our brains, composed of neurons and cells, evolved to structure information through distinctions, systems, relationships, and perspectives, much like the material structures from which they arose. Thought, as an emergent property, is thus a sophisticated manifestation of these fundamental organizational patterns. Table 3 demonstrates that the very nature of our thinking is born of the underlying DSRP structures of nature itself, reflecting a profound interconnectedness between our cognitive processes and the physical world.

DSRP Pattern	Element	Physical Example (Nature) <i>Reality organizes itself...</i>	Cognitive Example (Mind) <i>As a result of material organization...</i>
Distinctions	Identity (i)	Cell uses membranes, immune system, and proteins for self-recognition...	We see cells...
	Other (o)	...and differentiates self from others as well as distinguishing food/not-food, threat/not-threat.	...and distinguish cells from their environment and other cells.
Systems	Part (p)	Cells self-organize with other cells to form tissues/organs.	We see cells as part of larger structures...
	Whole (w)	Cell is made up of parts (nucleus, mitochondria, cytoplasm, cell membrane, etc.).	...but also see them as wholes in and of themselves made up of lesser parts.
Relationships	Action (a)	Plant cell releases oxygen as a result of photosynthesis; signals other cells.	We look to understand what plant cells do (how they act)...
	Reaction (r)	Plant cell reacts to sunlight by starting photosynthesis; respond to signals of other cells.	...and also how they react to a stimulus.
Perspectives	View (v)	Cell apprehends neighboring cell's biochemical signaling and physical interactions with the plant cell.	We comprehend cells; study, utilize, and write poetry about them...

	Point (p)	Plant cell detects light and adjusts growth (phototropism).	...and we see them as agents, even using them as sensors to tell us about their unique point of view.
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Table 3: Universal Application of DSRP Patterns in Mind and Nature

By recognizing that DSRP patterns are inherent in both cognitive and physical realms, we can use conscious awareness of DSRP to better align our mental models with Reality. For example, understanding how distinctions are made in both mind and matter can improve our ability to organize information and make sense of the world. Similarly, recognizing systems and relationships helps us see structure and interconnectedness, enhancing our problem-solving abilities and scientific understanding. Viewing things from multiple perspectives causes us to see the ecology of things from the point of view of the things in the ecology. Table 3 illustrates that DSRP patterns are universal, bridging the gap between mind and nature. By leveraging DSRP 483 properties, we can increase the likelihood of aligning our mental models with the realities of the physical world, thus improving our understanding and interaction with both. This alignment enhances our ability to navigate and respond to the complexities of both our mental and physical environments effectively.

Application Across Domains

DSRP is universally applicable across a wide range of domains, from everyday tasks to complex scientific and philosophical concepts. Table 4 illustrates the diverse applications of DSRP; including “outlier concepts,” where we see that DSRP patterns, and their elements are universal to even the most abstract, quantum, or philosophical outliers.

Domain	Examples
Everyday Life	Making a sandwich, planning a day, resolving family conflicts.
Work	Project management, team dynamics, strategic planning.
Education	Learning, teaching, curriculum design, teaching methods, student assessments.
Natural Sciences	Biological systems, ecological interactions, physical processes.
Social Sciences	Societal structures, human relationships, cultural perspectives.
Mathematics	Number line, calculus, geometry, graph theory, set theory.
Technology	Software development, system architecture, AI algorithms.
Art and Literature	Creative processes, narrative structures, artistic perspectives.
Outlier concepts	Abstract algebraic structures; Quantum states, entanglement, uncertainty principle; Concepts of infinity, nothingness, consciousness.

Table 4: Short List of Examples of Universality of Application of DSRP

Providing a Common Language for Interdisciplinarity

DSRP (Distinctions, Systems, Relationships, Perspectives) provides a universal model that can serve as a common language across various disciplines, facilitating interdisciplinarity and transdisciplinarity. By offering a structured way to understand and organize information, DSRP helps bridge the gaps between different fields of study, enabling more cohesive and comprehensive approaches to complex problems (See Table 5). By using DSRP as a common language, various disciplines can communicate and collaborate more effectively. For instance, physicists can discuss the behavior of quarks in terms that biologists might use to describe cellular interactions, and economists can relate monetary units to the broader systems in which they operate. This shared language allows for a deeper understanding of complex phenomena by integrating insights from multiple fields.

Interdisciplinarity involves integrating knowledge and methods from different disciplines to address complex problems, while transdisciplinarity goes beyond this by creating a unity of intellectual frameworks beyond the disciplinary perspectives. DSRP facilitates both by providing a structured approach to organizing information that is applicable across various fields. As a result, researchers and practitioners can develop more comprehensive and innovative solutions to global challenges. DSRP offers a universal language that bridges disciplinary divides, fostering interdisciplinarity and transdisciplinarity. By applying DSRP patterns, we can better align our mental models with the realities of diverse fields, enhancing our ability to understand and address complex issues. This promotes cohesive and collaborative efforts, driving progress and innovation across disciplines.

Field	Identity-Other Distinctions	Part-Whole Systems	Action-Reaction Relationships	View-Point Perspectives
Quantum Physics (quark)	Quark types (up vs. down quarks)	Quarks as parts of protons/neutrons	Quark interaction via strong force	Quarks as sensors
Physics (atom)	Identifying elements vs. isotopes	Atoms as parts of molecules	Atom's energy absorption leading to electron excitation	Atoms as sensors
Chemistry (molecule)	Differentiating between molecules (e.g., H ₂ O vs. CO ₂)	Molecules as parts of compounds	Molecule participation in chemical reactions	Molecules as sensors
Biology (cell)	Cell distinguishing self from non-self	Cells as parts of tissues/organs	Cell releasing oxygen as a result of photosynthesis	Cells as sensors
Psychology (individual)	Recognizing self vs. others	Individual as part of a family/community	Individual's actions based on thoughts/emotions	Individual's perspective within a social context
Sociology (group)	Group identifying itself vs. other groups	Groups as parts of societies	Group's collective actions in response to societal issues	Group's perspective within a larger social structure

Ecology (system)	Species differentiation (native vs. invasive species)	Species as parts of ecosystems	Species interactions (predation, symbiosis)	Ecology-level emergence based on organism-level perspectives and actions
Political Science	Nation-state identity vs. other nations	Citizens as parts of a nation	Government policies/actions in response to international events	Nation's perspective within global politics
Economy (monetary unit)	Currency differentiation (e.g., USD vs. EUR)	Currency units as parts of the economy	Market reactions to economic indicators	The perspective of cost, ROI, etc.
Astronomy (galaxy)	Identifying galaxies (e.g., Milky Way vs. Andromeda)	Stars as parts of a galaxy	Galaxy interactions (gravitational pull, collisions)	Scalar perspectives (e.g. powers of 10)

Table 5: Examples of DSRP Structure Across Various Disciplines

Table 5 demonstrates how the DSRP-483 is inherently used across various disciplines. Each field *implicitly* relies on making distinctions (identifying and differentiating entities), understanding systems (part-whole groupings), recognizing relationships (actions and reactions), and considering perspectives (different viewpoints). By *explicitly* applying the DSRP model, interdisciplinary understanding and collaboration can be enhanced. This structured approach helps in organizing knowledge, fostering communication between different fields, and solving complex problems through a unified perspective.

Aiding Cognition and Metacognition

DSRP as Common Sense

DSRP is essentially a theory of common sense, providing a structured way to apply basic principles of thinking to complex problems and to understanding our universe as free from the biases of perception, cognition, and emotion as is possible. By formalizing these principles, DSRP makes common sense explicit and teachable, making common sense more common.

Addressing Limitations of Aristotelian Logic

Traditional Aristotelian logic, with its binary distinctions, has been foundational in Western thought but also limited in its ability to handle complexity. DSRP, with its multivalent logic, provides a more robust model for understanding and navigating complex systems, relationships, and perspectives. DSRP encapsulates traditional bivalent logic within a broader multivalent model. Research findings indicate this bivalent bias, among other LAMO biases, affect the general public’s ability to select best choice solutions to wicked problems [12].

Addressing Bias

DSRP addresses various biases, including those stemming from the hemispheres of the bicameral mind [18] and deeply enculturated societal biases (such as LAMO, confirmation bias, and reality bias) [12]. By

integrating the four patterns of Distinctions, Systems, Relationships, and Perspectives, DSRP provides a balanced approach that mitigates these biases [4–7,19] and promotes a more holistic understanding of information.

Enhancing Growth Mindset

Research supports that DSRP provides concrete structure to the otherwise general concept of a Growth Mindset (i.e., the belief that intelligence is fixed, but it is not; it can change and evolve) [20]. By explicitly defining metacognition and awareness, DSRP offers specific tools and strategies, making the abstract principles of Growth Mindset more actionable. This detailed approach helps individuals understand and apply cognition and metacognition to achieve a growth mindset more effectively. For example, the intervention in the 2019 study [21] introduced students to neuroscience concepts that challenged the notion of fixed intelligence, significantly impacting their mindset. However, this approach was still quite general. DSRP, by contrast, provides the "teeth" needed to give Growth Mindset practical effectiveness through its structured patterns.

Ethics and Emotional Intelligence

There is a deep naturalistic ethical stance [22] to DSRP that increases emotional intelligence in parallel with analytical and synthetic intelligence. The practice of DSRP requires us to:

1. think about the other and reminds us not to “otherize” (e.g., Us vs. Them) or create externalities (e.g., We can’t afford X, but we can afford 10X because we ignore it);
2. consider the nested, fractal, contextual nature of things; avoid divorcing things from their context or purposefully lumping things together that don’t belong in order to arrive at desired but dubious conclusions;
3. look beyond the linear cause and blame that results, and see the web of causes that lead to any event or situation and see the interconnectedness of our actions;
4. recognize the perspective of the other and call into question the bias and or primacy of our own viewpoints.

DSRP is Equally Effective for All People, Everywhere

DSRP is unique in its universal and merit-based nature. Unlike major tests like IQ, CCTT, Big 5, SAT, GRE, and EQ, which are correlated with socio-economic status (SES), education, age, gender, and race, DSRP shows no such correlations. Research consistently demonstrates that DSRP is unaffected by these demographic factors, making it an inclusive tool for enhancing cognitive abilities across diverse populations. The absence of demographic biases in DSRP indicates its potential as a powerful tool in education to level the playing field. By providing an equitable model for developing thinking skills, DSRP ensures that all individuals, regardless of background, can enhance their cognitive abilities, promoting fairness and maximizing cognitive growth. This creates hope for development of a universal set of methods to increase metacognitive awareness for anyone, anywhere. Thus a translation of the theory to practical steps anyone can take to increase their cognitive abilities was required.

Cognitive Moves

The concept of cognitive moves grounded in the DSRP, offers a structured approach to enhance cognitive abilities. These moves represent a set of thinking skills that are crucial for organizing information and unlikely to be replaced by AI. While DSRP provides elemental structures used to organize information in mind and nature, Moves are molecular configurations of these elemental structures that can vary in their complexity. Research [4–8], [10]] has led to the discovery of an 80/20 rule in cognitive moves: learning and practicing just five core moves (called the “Big 5+ DSRP Moves”) results in significant improvements in thinking performance, ranging from 280% to 500% and averaging around 380% across various contexts. This finding underscores the efficiency and effectiveness of focusing on key cognitive strategies that can be practiced. Analogies and metaphors, used by humans for thousands of years, illustrate the enduring nature of cognitive moves. These tools are universal, employed by all cultures to understand and explain complex concepts. This historical precedent suggests the value of such universal and pragmatic structures. To date, 47 cognitive moves have been identified [23], each contributing uniquely to our understanding and processing of information. The discovery of a cognitive move is akin to discovering a prime number: it reveals a fundamental building block of thinking. The DSRP algorithm continues to uncover these moves, offering a systematic way to enhance cognitive capabilities. The identification and application of cognitive moves provide a significant advantage in learning and thinking. By focusing on the most impactful moves, individuals can dramatically improve their cognitive performance and adaptability, making them more proficient in navigating complex information landscapes. This research highlights the potential for continued discovery and application of cognitive moves to further enhance human intelligence and problem-solving abilities. With the rise of AI, content and even content analysis and synthesis will become automated. An educational curriculum dominated by content coverage quickly becomes a dinosaur in this context. Therefore, these cognitive moves provide a comprehensive curriculum for education, to further develop the skills that AI doesn't possess, or metacognition.

DSRP Theory generates thousands of potential moves, hundreds of which have been discovered already. But the Big 5+ moves are a Pareto law discovered in the research that shows us that nearly 80% of the benefit can be achieved with a small number of moves. This is not an uncommon occurrence in skill development of any kind, as it is often a basic set of skills that will get a person from novice to excellent. From excellent to world class (think great athlete to olympic level athlete) will take significantly more practice, effort, and refinement. But for most mortals, the Big5+ moves are not only a great start but will completely transform the way you think. The “+” refers to “Move Mash Up” which simply means taking two or more moves and using them together, in unison (example: RDS’ing the Rs of a Part Party). The Big 5+ DSRP Moves include:

1. Is/Is Not List

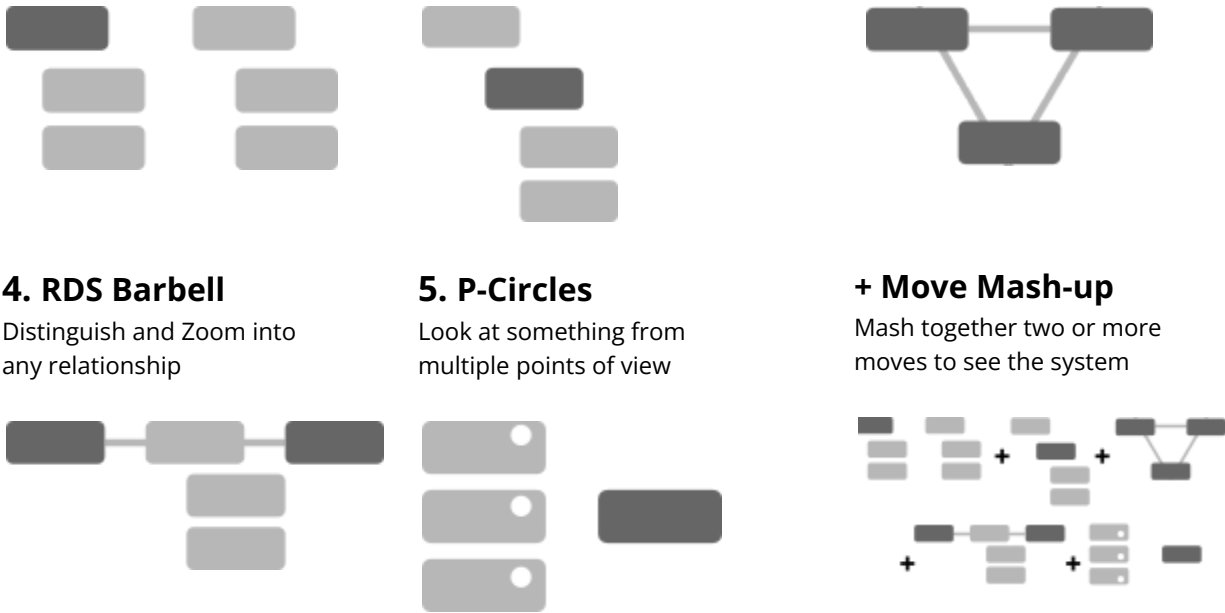
Distinguish fundamentally
what something is and is not

2. Zoom in/Outs

Zoom into the details and
Zoom out to the wider context

3. Part Parties

Relate the parts to see
causal webs



4. RDS Barbell

Distinguish and Zoom into any relationship

5. P-Circles

Look at something from multiple points of view

+ Move Mash-up

Mash together two or more moves to see the system

Table 6: The Big 5+ Cognitive Moves

(with dark gray indicates starting condition and light gray indicates the added change that constitutes the cognitive “movement”)

System 1, System 2, and System 3 Thinking

Kahneman and Tversky's research [24–26] introduced two modes of thinking: System 1, which is fast and often erroneous, and System 2, which is slow and more accurate but requires metacognition. System 1 operates automatically and effortlessly, while System 2 demands conscious effort and deliberate thought. But both System 1 and System 2, especially in the fast paced and complex environment in which we currently live, are sub-optimal: System 1 is fast and wrong and System 2 is slow and right. We coined the term System 3 to distinguish a third type of thinking–leveled up through the application of practice and rehearsal. Such practice and rehearsal is common to special forces operators, olympic and professional athletes, and the like, to pre-program deeper skills that are required in fast paced, high stakes situations. DSRP generally, and specifically the Big 5+ DSRP Moves, enables this third mode of thinking, *System 3*, which combines the speed of System 1 with the accuracy of System 2 through structured metacognition and practice. By training in the Big 5+ DSRP Moves (Is/Is Not List, Zoom In/Out, Part Party!, RDS Barbell, and P-Circle), individuals can develop the essential, needed cognitive habits to enhance their thinking abilities.

Giving Teeth to Cognition and Metacognition

Metacognition, or the awareness of one's own thought processes, is crucial for high achievement across all domains [1]. While the field is rich with excellent theories and results, these often amount to "all gums, no teeth" – they provide general insights without specific, actionable strategies. DSRP provides the "teeth" that make these theories practically useful. General metacognitive awareness is a significant competitive advantage. A meta-analysis [2] of emotional intelligence (EI) showed metacognition

improved the skill. However, these general theories often lack specificity. Awareness and application of DSRP significantly improve cognitive complexity and fluid thinking. A study on cognitive bias [19] showed not only that DSRP education increased thinking ability but also that significant biases occur that can be incorporated into training for better effect. In 27 studies [4–8], DSRP was shown to be universal to a diversity of cognitive tasks. The "Fish Tank" experiments [10] demonstrated that metacognitive awareness of DSRP elements (Distinctions, Systems, Relationships, Perspectives) greatly enhances cognitive performance. Studies into the effect of the Big 5 DSRP Cognitive Moves [11] showed between 280% and 500% increases in problem solving and thinking ability based on a treatment of just 1 minute. This specific approach transforms general metacognitive awareness into a powerful tool, providing a substantial and notable increase in problem solving and complexity of thought.

Conclusion

The DSRP Theory offers a powerful, universal model for understanding and/or organizing information and for evolution of both physical matter (nature) and cognitive meaning (mind). Because it applies to both mind and matter, it acts as a bridge for increasing the probability of getting our mental models increasingly aligned (probabilistically) with reality. Its evidence in cognitive science and in natural phenomena, combined with its practical impact on problem-solving and systems thinking, underscores its value. By encapsulating traditional bivalent logic within a broader multivalent model, DSRP enhances our cognitive toolkit, making common sense more common and effective. DSRP applies to everything and is universal, from mundane tasks like making a sandwich to complex scientific theories and philosophical debates, proving its profound and far-reaching applicability. It has the potential to bring our mental models more in alignment with reality, bring the disciplines together (interdisciplinarity), connect people, profoundly impact human learning and development, and, as the core theory of metacognition, improve human effectiveness in all domains.

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