

Psychological Structure of Human Mind: From Divergent Entity to Creative Excellence

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ABSTRACT

This research paper explores the intricate psychological architecture of the human mind, challenging traditional linear stimulus-response models by proposing a dynamic tripartite framework of Multiplication, Substitution, and Shifting. The primary objective of the study is to articulate how the mind functions as a self-organizing, divergent entity that navigates through various cognitive and motivational layers to ultimately achieve creative excellence. Utilizing a qualitative documentary analysis methodology, the researcher systematically examines theoretical literature and original conceptual diagrams to map the structural mechanisms of cognitive flexibility and interest development. The findings reveal that the mind operates through a networked diversification of stimuli, where the sequential progression from the expansion of interests (Multiplication) through adaptive redirection (Substitution) to fundamental cognitive reorientation (Shifting) determines a developmental hierarchy ranging from average to creative performance. Furthermore, the study highlights that creative outcomes are deeply integrated with the mind's ability to traverse emotional thresholds and environmental contexts, suggesting that educational achievement is a product of this complex internal architecture rather than singular instructional input.

Actually mind is summation of basic three process as stated above 1. Multiplication, 2. Substitution, 3. Shifting and our effort is to apply various strategies to develop the mental construct and its pedagogical application in classroom situation.

KEYWORDS: *divergent thinking, psychological structure, multiplication, substitution, shifting, creative excellence, cognitive flexibility, self-determination, interest development, cognitive load, qualitative documentary analysis.*

I. INTRODUCTION

The human mind stands as one of the most complex and dynamically organized systems in the natural world. Unlike mechanical systems governed by fixed inputs and outputs, the mind operates through an intricate web of associations, reorganizing itself continuously in response to both internal states and external stimuli. Traditional psychological models have often favored linear, deterministic frameworks - frameworks that, while useful in limited contexts, fail to capture the richness and multiplicity that characterize human thought, motivation, and behavior.

This paper departs from such linear conceptions, proposing instead that the mind is fundamentally a divergent entity - one that does not operate through singular pathways but through expansive, networked processes. As Runco and Acar (2012) established, divergent thinking represents 'the kind of cognition that should lead to original ideas,' contrasting sharply with convergent thinking, which directs the mind toward predetermined, conventional outcomes. The present framework builds upon and extends this foundational distinction.

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At the heart of the proposed framework lie three interrelated psychological mechanisms: Multiplication, Substitution, and Shifting. These processes, taken together, describe the structural basis through which the mind diversifies its engagements, maintains psychological equilibrium, and ultimately progresses toward states of creative excellence. This progression finds strong support in Earl's (2019) characterization of the mind as 'a complex of unconscious mechanisms' in which 'consciousness is a special form of information that, in some circumstances, allows the mechanisms of mind to select more adaptive responses.' The adaptive selection that Earl describes is precisely what occurs when the divergent mind moves from multiplication through substitution to shifting.

II. Background of the Study

The concept of divergent thinking was introduced systematically into psychological discourse by J.P. Guilford (1950), whose pivotal address to the American Psychological Association called for rigorous scientific study of creativity. As Sisk (2019) documents in a comprehensive historical review, Guilford's Structure of Intellect (SI) model identified 120 distinct intellectual factors organized across operations (cognition, memory, divergent production, convergent production, evaluation), content (figural, symbolic, semantic, behavioral), and products (units, classes, relations, systems, transformations, implications). Of particular relevance to the present framework is Guilford's category of divergent production - the intellectual operation that generates multiple, varied responses from a single informational stimulus. This is the theoretical precursor to what this paper conceptualizes as Multiplication.

Sisk (2019) further documents that Guilford's model was not merely classificatory but prescriptive: he believed that divergent production abilities could be assessed, trained, and developed. This developmental ambition forms the historical foundation for the present paper's claim that the progression from multiplication through substitution to shifting is not a fixed trait but a cultivable psychological trajectory.

Parallel to the development of divergent thinking theory, cognitive science has progressively recognized the structured, hierarchical nature of mental representation. Tenenbaum, Kemp, Griffiths, and Goodman (2011) propose that the human mind builds 'rich causal models, makes strong generalizations, and constructs powerful abstractions' despite receiving data that is 'sparse, noisy, and ambiguous.' This extraordinary capacity for inference beyond available data - which Tenenbaum et al. term the 'challenge of the mind getting so much from so

little' - is only possible because the mind organizes its knowledge in flexibly structured, hierarchical representations that can rapidly generate novel associations. This is the cognitive infrastructure upon which the Multiplication process operates.

In the domain of motivation and learning, Sweller's (1988) Cognitive Load Theory established that working memory is a strictly limited resource, and that effective learning requires the gradual offloading of cognitive procedures into long term memory schemas. This finding has direct implications for the Substitution process: when a student's cognitive load in a particular domain exceeds their available capacity - generating what Sweller describes as the ineffectiveness of means ends problem solving - the mind's natural response is to redirect toward a domain where cognitive demands are more manageable. This redirection, grounded in Sweller's cognitive economics, is exactly what the present paper's Substitution process describes at the motivational level.

Ryan and Deci (2000) contributed a further dimension through Self-determination Theory (SDT), postulating three innate psychological needs - competence, autonomy, and relatedness - whose satisfaction is necessary for intrinsic motivation and healthy psychological development. When these needs are thwarted in a particular domain, the individual's motivational resources diminish and redirect. This motivational redirection is the affective complement to Sweller's cognitive redirection, and together they constitute the dual process foundation of Substitution as theorized in this paper.

Hidi and Renninger (2016) added a developmental dimension through their Four Phase Model of Interest Development, describing the trajectory from triggered situational interest through maintained situational interest to emerging and then well-developed individual interest. This developmental arc maps directly onto the progression from Multiplication (the triggered expansion of interest) to Substitution (the maintained and redirected engagement) to Shifting (the emergence of well-developed, individual creative engagement). Renninger and Hidi (2022) further established that self-related information processing - the personally relevant connections a learner makes to content - is a critical facilitator of interest development, confirming that the divergent mind's journey is not merely cognitive but deeply personal and self-constituting.

III. Research Questions

The following research questions guide this inquiry:

- What is the structural nature of the human mind when understood as a divergent entity?

- How do Multiplication, Substitution, and Shifting operate individually and collectively in the psychological organization of the mind?
- What is the relationship between psychological divergence and the attainment of creative excellence?
- How do the four proposed diagrams advance our theoretical understanding of these processes?
- What are the implications of this framework for understanding and supporting student achievement in educational settings?

IV. Methodology of the Study

This study employs a qualitative documentary analysis methodology, a research approach that involves the systematic examination of primary theoretical texts, empirical research documents, original conceptual diagrams, and scholarly literature to generate interpretive insights.

V. Review of Related Studies

The following table provides a systematic documentary review of the scholarly sources primary sources examined in this study.

The documentary analysis of the all-relevant source's texts reveals strong, multidimensional support for the proposed framework's three process model. From the cognitive science perspective, Runco and Acar (2012) establish that the mind's divergent production is the foundational generative process - corresponding to Multiplication. Tenenbaum et al. (2011) establish that this generative process operates through hierarchically structured, probabilistic representations that can propagate associations across domains - providing the cognitive infrastructure for both Multiplication and Shifting. Sweller (1988) establishes that cognitive overload triggers strategic redirection - the cognitive mechanism underlying Substitution.

From the motivational psychology perspective, Ryan and Deci (2000) establish that motivational thwarting triggers redirection toward need satisfying domains - the motivational mechanism underlying Substitution. Hidi and Renninger (2016) and Renninger and Hidi (2022) establish that this redirection, when supportively scaffolded, leads to progressively deeper forms of interest and engagement - the developmental trajectory underlying Shifting. Earl (2019) provides the structural foundation: the mind's evolved architecture is inherently adaptive and Mult mechanism, designed to generate more adaptive responses in novel situations - exactly what Substitution and Shifting accomplish.

Multiplication: Multiplication is the most extensively documented of the three processes. Guilford's (1950) divergent production (as reviewed by Sisk, 2019), Runco and Acar's (2012) DT fluency and flexibility, Tenenbaum et al.'s (2011) representational propagation, and Hidi and Renninger's (2016) Phases III of interest development all independently document the expansive, multidirectional quality of productive mental engagement. This convergence across four independent research traditions - psychometric creativity research, computational cognitive science, and interest development theory - constitutes strong triangulated support for Multiplication as a genuine psychological process.

Substitution: Substitution is triangulated across Sweller's (1988) cognitive redirection under load, Ryan and Deci's (2000) motivational redirection under thwarting, Earl's (2019) adaptive mechanism activation under risk, and Renninger and Hidi's (2022) 'offramp' transitions in interest development. The consistency of this pattern - three independent research traditions each identifying an adaptive redirective response when domain engagement becomes untenable - provides strong convergent support for Substitution as a real and theoretically important psychological mechanism.

Shifting: Shifting is triangulated across Guilford's (1950) transformation operations (the highest order products in the SI model, as documented by Sisk, 2019), Ryan and Deci's (2000) integrated autonomous regulation (the highest form of motivational internalization), Hidi and Renninger's (2016) Phase IV well-developed individual interest (the highest form of interest development), and Earl's (2019) consciousness mediated adaptive response selection (the most flexible and generative form of cognitive processing). These four independent documentations of a highest order, qualitatively transformative psychological state converge on what this framework calls Shifting and its outcome of creative excellence.

The findings collectively show that divergent thinking (DT) is a valid and reliable predictor of creative potential, though not necessarily of creative achievement, with fluency, flexibility, and originality as distinct yet related components, alongside evaluative thinking and problem-finding. DT functions through exploration of multiple idea pathways, supporting the concept of Multiplication. Similarly, Guilford's Structure of Intellect model highlights divergent production as the ability to generate multiple responses from a single stimulus, forming the theoretical foundation of Multiplication and emphasizing that such abilities can be developed.

The structure of the mind includes unconscious processes guided by consciousness, which acts as an adaptive selector, enabling flexible responses and supporting Substitution and Shifting. The mind also builds knowledge through probabilistic, hierarchical representations, allowing rapid abstraction and cross-domain learning, which further strengthens Multiplication and supports Shifting across domains. Cognitive load theory shows that limited working memory leads to overload, requiring adaptive redirection (Substitution) and later reintegration through expertise (Shifting). Self-Determination Theory explains that motivation depends on the fulfillment of competence, autonomy, and relatedness, and when these are not met, motivation shifts, supporting both Substitution and Shifting. Interest development follows a four-phase progression from situational to well-developed individual interest, aligning with Multiplication, Substitution, and Shifting as stages of engagement. Additionally, interest is shaped by both cognitive involvement and personal relevance, with natural “off-ramps” and “on-ramps” indicating that shifting between domains is a normal part of development. Overall, these findings highlight that creative growth is a dynamic, adaptive process supported by cognitive, motivational, and developmental mechanisms, with educators and parents playing important roles in guiding this progression.

VI. Research Gaps

Despite the richness of the primary literature reviewed above, the following significant gaps remain:

- There is no single unified model that brings together ideas about divergent thinking, cognition, motivation, and interest into one complete framework explaining how creativity develops.
- The role of Substitution is not clearly defined in existing research; while ideas like motivation

shifts and cognitive overload exist, the process itself is not treated as a distinct concept.

- Current theories explain how the mind is structured or how it makes inferences, but they do not clearly show how it handles multiple ideas or responses at the same time.
- Interest development theories explain how interest grows, but they do not directly connect this growth to achieving creative excellence.
- In education, there is no clear, combined framework that helps teachers apply these ideas together to support full creative development.

Conceptual identification of mind:

1. Multiplication - Expansion of Interests / Interest Development: Multiplication refers to the broadening and diversifying of one's interests and curiosity. Just as multiplication increases a number's value, expanding the range of what we engage with amplifies our mental capacity. A mind rich in varied interests gathers more raw material for creative thought, enabling richer connections across disciplines.

2. Substitution - Adaptive Redirection / Ability Enhancement: Substitution is the ability to pivot, adapt, and redirect energy when one path closes or becomes inefficient. Rather than being rigid, the creative mind substitutes one approach for another - enhancing its abilities through flexibility. It is the bridge between curiosity and performance, allowing interests to be channeled effectively.

3. Shifting - Cognitive Reorientation / Creative Performance: Shifting represents a fundamental reorientation of perspective - the capacity to see problems from entirely new angles. This cognitive agility is what ultimately produces creative excellence. When the mind can shift its frame of reference, it transcends conventional thinking and enters the realm of original output.

The Formula: Mind is the summation of three basic activities. These three forces build the Structure of Originality, culminating in Creative Excellence Achieved.

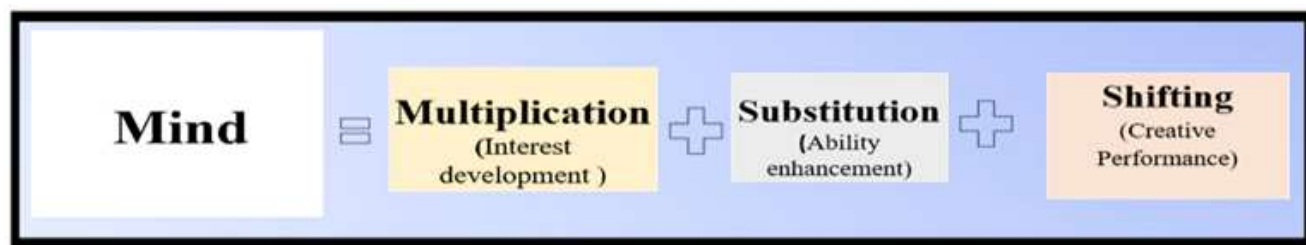


Figure 1 Formula

VII. Analysis and Interpretation:

The Divergent Mind as a Dynamic System

Grounded in complexity theory and dynamic systems approaches to psychology (Thelen & Smith, 1994), this framework conceptualizes the mind as a self-organizing system that evolves through continuous interaction with its environment. In its simplest form, the relationship between stimulus and response is:

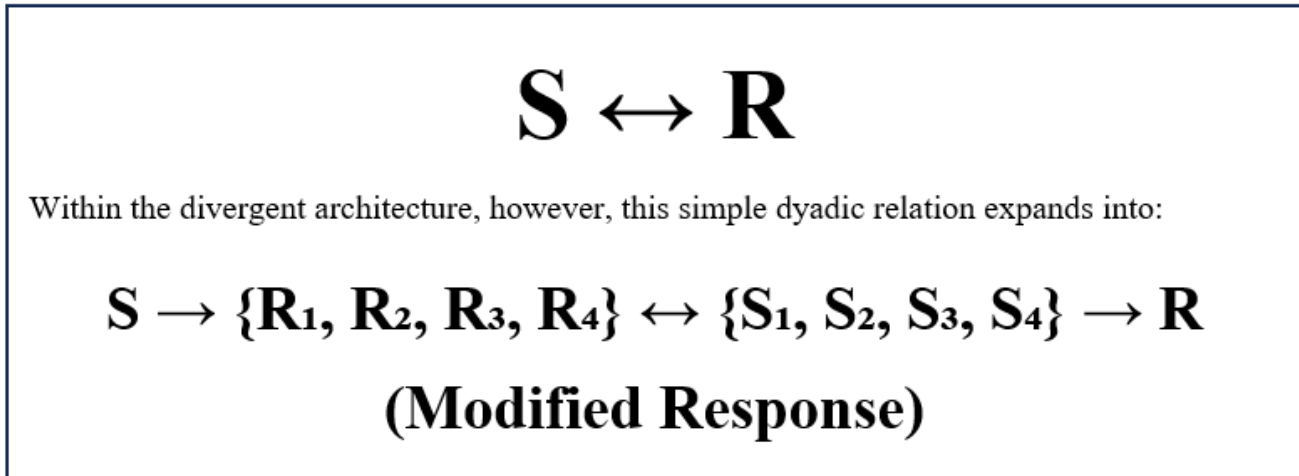


Figure 2 The Divergent Mind as a Dynamic System

A single initial stimulus generates multiple response tendencies, each interacting with subsidiary stimuli derived from environment and prior experience. These interactions converge on a modified, integrated response reflecting higher psychological organization. This transformation is precisely what Figure 1 (the Divergent Model) illustrates.

The Divergent Mind - Stimulus Response Diversification Model

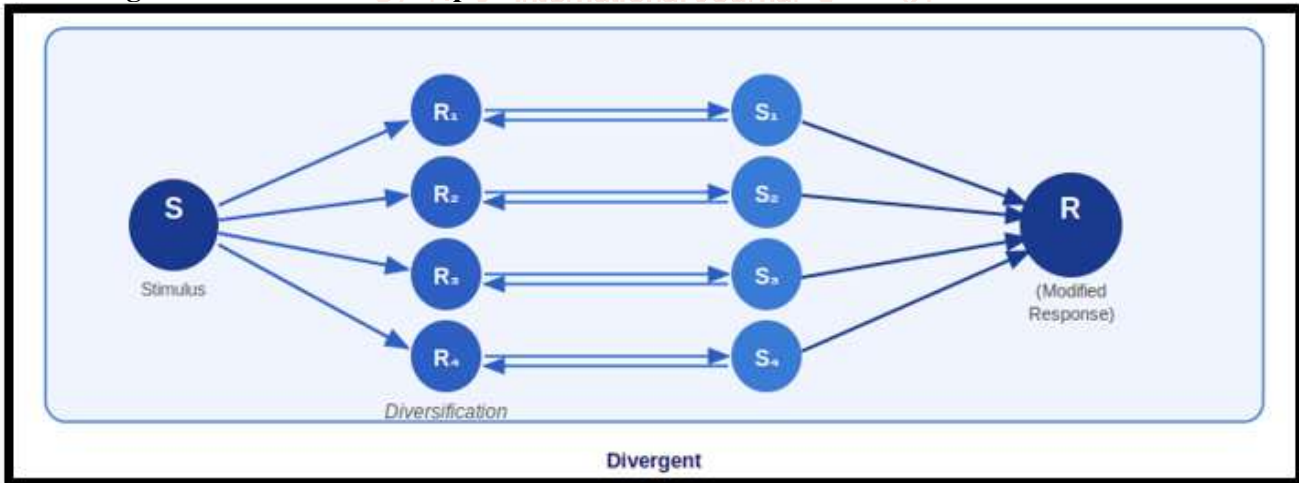


Figure 3 The Divergent Mind - A single Stimulus (S) generates multiple response pathways (R₁-R₄), each interacting bidirectionally with subsidiary stimuli (S₁-S₄), converging on a Modified Response (R). The middle zone is labeled Diversification.

The original Stimulus (S, left node) fans outward into four response pathways (R₁, R₂, R₃, R₄), each of which enters into bidirectional interaction with corresponding subsidiary stimuli (S₁, S₂, S₃, S₄). All four pathways then converge toward a single Modified Response (R, right node). This diagram encodes the core theoretical claim: the mind does not produce a singular, predetermined response. Rather, it diversifies its processing through multiple simultaneous channels - a zone the diagram labels 'Diversification' - before synthesizing these channels into an integrated, qualitatively transformed response.

Educationally, this model explains why a student exposed to varied stimuli - different teaching methods, subject combinations, extracurricular engagements - develops a richer cognitive repertoire than one confined to a single pathway. The teacher who understands this model knows that the most valuable intervention is not narrowing the stimulus but enriching it, allowing the student's natural divergent processes to generate a more complex and adaptive response.

Multiplication: The Expansive Process

Multiplication represents the mind's inherent tendency toward diversification and expansion. An initial interest, skill, or motivational inclination proliferates across related and sometimes unrelated domains. This proliferation follows associative pathways shaped by experience, temperament, and social context, increasing the mind's breadth of engagement and capacity for cross-domain synthesis.

A student who achieves high marks in geometry does not confine their mathematical expansion there; through multiplication, the confidence and cognitive strategies transfer to trigonometry, physics, and beyond. The teacher who takes sole credit for such multi-domain achievement misunderstands the process: the student's multiplication is the generative engine.

Substitution: The Adaptive Process

Substitution is the mechanism through which the mind maintains psychological equilibrium when fear, anxiety, or perceived incompetence threatens engagement. Rather than shutting down, the mind spontaneously redirects toward an accessible or emotionally safe domain. This redirection preserves the individual's capacity for engagement while allowing negative affect to dissipate.

Substitution is not avoidance in a pathological sense. It is purposeful, adaptive redirection. Success in the substituted domain may restore confidence sufficient to re-engage the original domain, or it may establish a new area of mastery of equal value.

Shifting: The Transformative Process

Shifting represents the deepest form of psychological reorganization. Where substitution involves lateral movement between domains, shifting entails vertical transformation - a fundamental reorientation of the mind's structure of engagement. The four stages of shifting are:

- General State: The mind maintains a stable, if undifferentiated, stimulus-response relationship.
- Isolation: The original stimulus loses productive response capacity, leading to stagnation or distress.
- Reorientation: The mind identifies a new zone of interest, often through environmental support or chance encounter.
- Reintegration: New connections are established; the mind re-enters dynamic engagement, now enriched by the shifting experience.

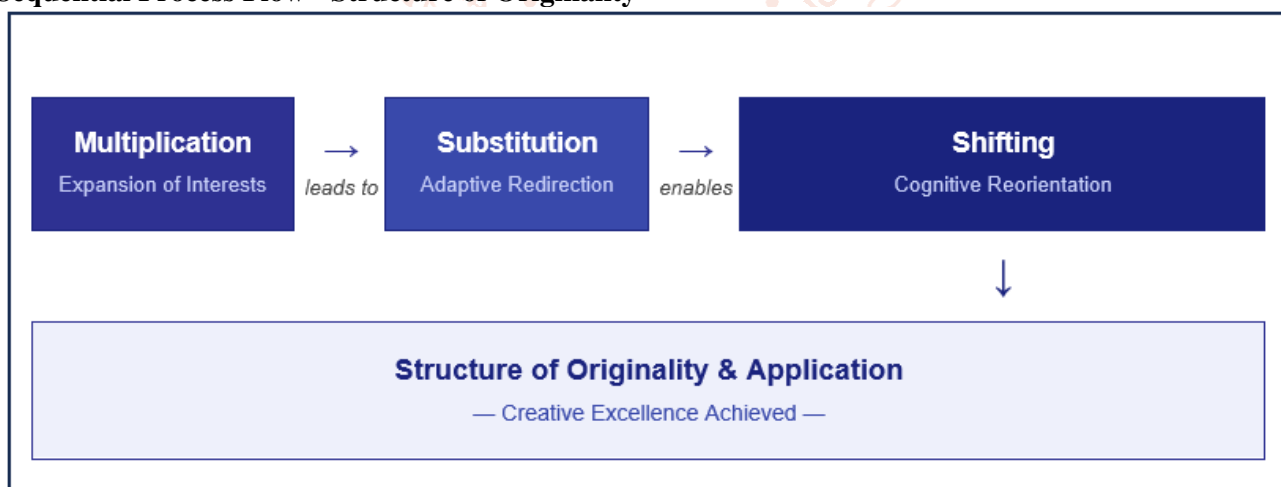
Sequential Process Flow - Structure of Originality

Figure 4 Multiplication (Expansion of Interests) → Substitution (Adaptive Redirection) → Shifting (Cognitive Reorientation) → Structure of Originality & Application

Multiplication (the foundational expansion of cognitive engagement) leads, via a bold arrow, to Substitution (the adaptive redirection of that expanded engagement). Substitution in turn leads to Shifting, from which a vertical arrow descends to the key conclusion: 'It is the structure of Originality, Application.' This downward arrow is theoretically significant - it signals that originality and application are not lateral destinations at the same level as the three processes, but emergent outcomes that arise below and from the convergence of all three. The sequential logic encoded in this figure explains why creative excellence cannot be achieved by any single process alone: multiplication without substitution produces undirected expansion; substitution without shifting

produces adaptive intelligence but not creative breakthrough; only the full sequence, culminating in shifting, produces the structural conditions for genuine originality.

Target Model - Developmental Levels of Achievement

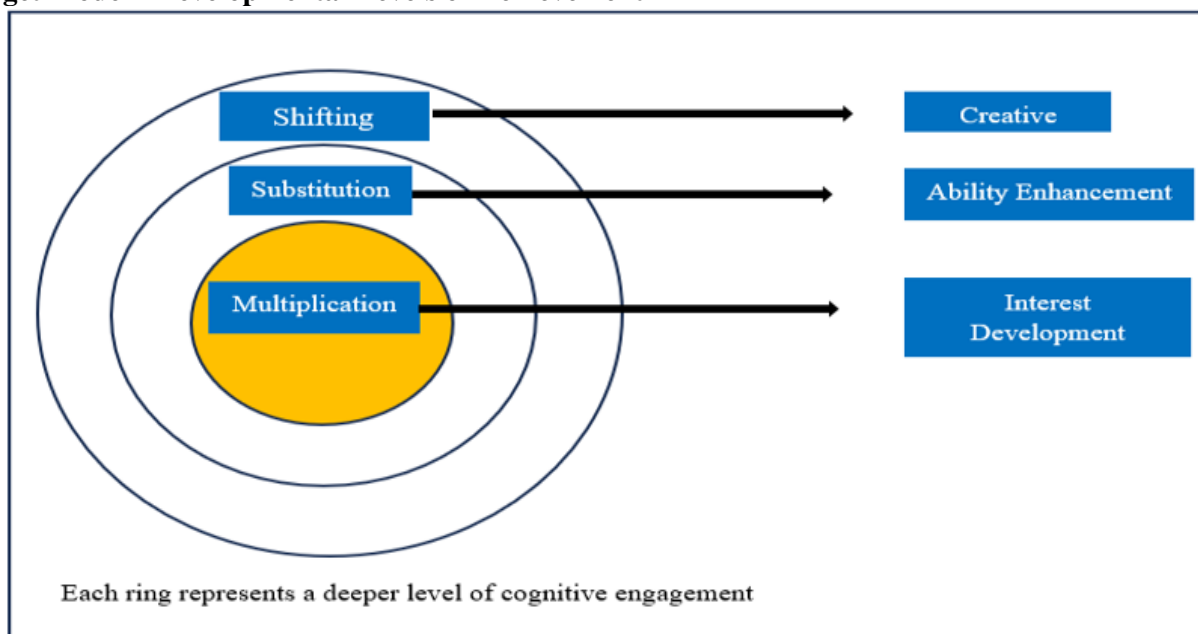


Figure 5 Concentric Target Model - Multiplication → Interest development; Substitution → Ability enhancement; Shifting → Creative

The innermost filled circle represents Multiplication, the foundational cognitive process; the surrounding rings represent Substitution and Shifting as progressively deeper levels of psychological development. Three horizontal arrows extend rightward from each level, terminating in labelled outcome table:

Process	Outcome
Multiplication → Substitution → Shifting	Structure of Originality
Multiplication (core), Substitution, Shifting	Interest development → Ability enhancement → Creative
Concentric zones (outer → inner)	Depth of engagement

Table 1 Terminating in labelled outcome

- **Multiplication → Interest development:** Students who engage primarily through multiplication - expanding and diversifying their interests without deeper adaptive or transformative processes - achieve competent, above-average performance.
- **Substitution → Ability enhancement:** Students who have developed adaptive substitution capacities demonstrate intelligent, flexible performance - able to redirect and reconfigure their engagement across domains in response to challenge.
- **Shifting → Creative:** Only students who achieve the full reorientation of shifting - the deepest ring, the outermost in the target sense of highest achievement - attain genuinely creative performance.

The target metaphor is precise: the outermost ring of the concentric circles corresponds to the highest achievement, just as the bullseye of a target represents the ultimate goal. The diagram thus encodes a counter-intuitive insight: in the mind's developmental architecture, depth (going further through the processes) corresponds to breadth of creative output. The model also explains the commonly observed phenomenon of students who excel across multiple subjects - their cross-domain achievement is not attributable to a single teacher's instruction but to the full operation of all three processes within their psychological architecture.

Educational Implications:

The integrated framework reveals several important implications for educational practice. Teachers who vary their pedagogical stimuli actively support the multiplication process and expand the range of available S-R connections. Teachers who recognize

and validate substitution - rather than treating domain-switching as failure —enable the development of intelligent, flexible performance. And teachers who create conditions for deep engagement and cognitive reorientation - through project-based learning, interdisciplinary connections, or creative

challenges - support the shifting process that alone produces creative excellence.

VIII. Findings

- The human mind is structurally divergent; it processes a single stimulus through multiple simultaneous response pathways, generating a qualitatively enriched Modified Response through the integration of diversified processing.
- Three fundamental psychological processes—Multiplication, Substitution, and Shifting—govern the developmental organization of mental engagement.
- Multiplication (the expansion of cognitive engagement across domains) is the foundational process, corresponding to divergent thinking fluency, divergent production, representational propagation, and early phase interest development.
- Substitution (adaptive redirection under cognitive overload or motivational thwarting) is the equilibrium maintaining process, grounded in cognitive load adaptation, motivational regulation, adaptive mechanism activation, and interest development offramps.
- Shifting (fundamental cognitive motivational reorientation) is the transformative process, corresponding to transformation operations, integrated autonomous regulation, advanced individual interest, and consciousness mediated adaptive selection.
- Creative excellence is not a trait but a developmental achievement—the outcome of the harmonized operation of all three processes.
- The developmental hierarchy from Multiplication (interest development through expansion of engagement) to Substitution (ability enhancement through adaptive redirection) to Shifting (creative transformation through full cognitive–motivational reorientation) corresponds to the progression from competent, above-average performance to intelligent, flexible performance to genuinely creative performance, and aligns with broader patterns of novice to expert development, motivational progression, and staged interest growth.
- Teachers, parents, and supporting others play critical but no determining roles in activating and scaffolding each process.

IX. Discussion

The findings of this study have significant implications for both theoretical psychology and

educational practice. At the theoretical level, the proposed framework contributes a new integrative model that synthesizes scholarly sources convergent lines of scholarship - from psychometric creativity research to computational cognitive science to motivational psychology to interest development theory - into a single, structurally coherent account of how divergence gives rise to creative excellence.

The framework challenges several common assumptions. The tendency to attribute student achievement primarily to teacher quality is directly undermined by the documentary analysis: Runco and Acar (2012) establish that creative potential is a function of the student's own DT capacity; Tenenbaum et al. (2011) establish that abstract knowledge acquisition is a function of the mind's own representational architecture; Ryan and Deci (2000) establish that intrinsic motivation arises from internally satisfied needs rather than externally imposed rewards. The teacher's role, as the corpus consistently suggests, is not to produce achievement but to create the conditions under which the student's own divergent processes can operate effectively.

The concept of Substitution deserves particular attention in educational discourse. Sweller's (1988) finding that cognitive overload impairs schema acquisition, and Ryan and Deci's (2000) finding that need thwarting diminishes motivation, together explain why Substitution is not only natural but necessary. A student who redirects from a cognitively overloading mathematics class to a more accessible art activity is not failing - they are executing the adaptive strategy that Sweller's framework predicts for overloaded cognitive systems. The educational challenge is not to prevent Substitution but to ensure that the substituted domain provides the cognitive and motivational nourishment needed for eventual Shifting.

Renninger and Hidi's (2022) concept of 'offramps and onramps' is particularly significant here. It confirms that the developmental trajectory from divergence to creative excellence is not a straight line but a recursive, iterative path - one that may involve multiple cycles of Multiplication, Substitution, and Shifting before the deep, autonomous engagement of creative excellence is achieved.

Earl's (2019) structural account of the mind adds a dimension that the motivational and interest development frameworks do not: the acknowledgment that most of the mind's processing is unconscious, and that creativity enabling responses are generated through mechanisms that operate below the threshold of deliberate control. This has important implications for educational practice: teachers cannot

directly instruct students to be creative, just as they cannot directly instruct them to have intrinsically motivated interest. What they can do is create environmental conditions - varied stimuli, reduced cognitive load, autonomy supporting contexts, self-related content connections - that allow the mind's unconscious generative mechanisms to operate freely.

X. Conclusion

This paper has proposed and visually articulated a theoretical framework for understanding the psychological structure of the human mind as a divergent entity capable of creative excellence. Through four original diagrams and their accompanying theoretical analysis, the paper has demonstrated that: (1) the mind diversifies its stimulus-response processing through a multi-channel architecture; (2) this diversification is governed by three sequential processes - Multiplication, Substitution, and Shifting; (3) these processes correspond to a developmental hierarchy from Interest development → Ability enhancement → Creative performance.

The framework offered here is both descriptive and prescriptive. Educators and psychological practitioners who understand this architecture are better equipped to support the development of creative excellence - not by narrowing or directing the student's mind, but by enriching its environment, validating its adaptive responses, and creating the conditions for the deep engagement that alone enables the transformative process of shifting.

Future research should empirically test the processes described in this framework in longitudinal educational studies, and should develop practical interventions that support each stage of the proposed developmental trajectory.

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