#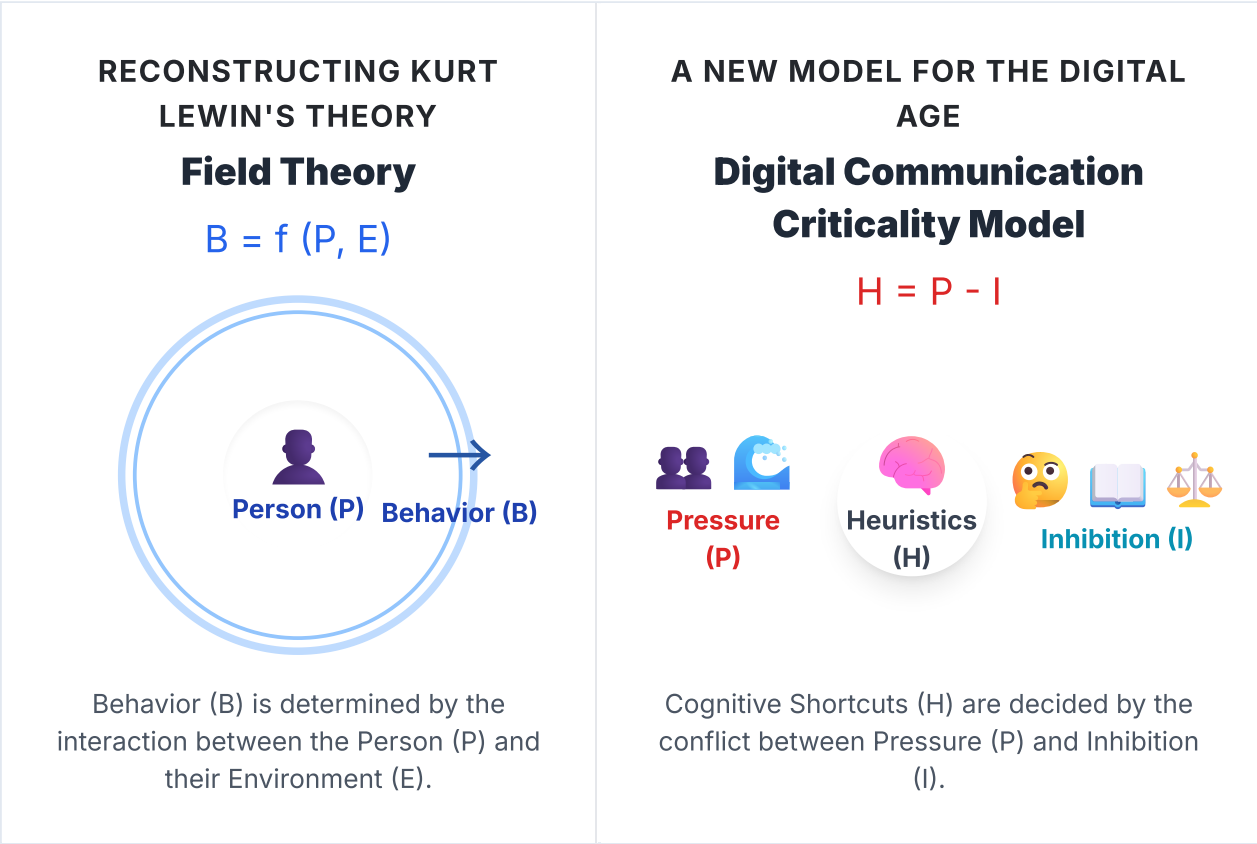 A Theoretical Study on Decision-Making Processes in the Digital Environment: Proposing the "Digital Communication Criticality Model"

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RECONSTRUCTING KURT LEWIN'S THEORY

Field Theory

$$B = f(P, E)$$

Person (P) → **Behavior (B)**

Behavior (B) is determined by the interaction between the Person (P) and their Environment (E).

A NEW MODEL FOR THE DIGITAL AGE

Digital Communication Criticality Model

$$H = P - I$$

Pressure (P) — **Heuristics (H)** — **Inhibition (I)**

Cognitive Shortcuts (H) are decided by the conflict between Pressure (P) and Inhibition (I).

Abstract

This paper proposes a new theoretical framework, the "Digital Communication Criticality Model," to structurally understand the impact of the modern digital information environment on individual decision-making processes. In a society where information overload and high-speed communication are the norm, there is a noted tendency for people to rely on intuitive judgments, i.e., "cognitive shortcuts" (heuristics), without deep thought. This phenomenon is not treated as a problem specific to a particular generation but as a universal issue arising from the interaction between external information environments and individual internal factors. This model formulates the likelihood of cognitive shortcuts (H) as the difference between the "Pressure" that induces heuristic thinking and the "Inhibition" that promotes deliberate thought. Specifically, it is defined as $H = P - I$. Furthermore, P is expanded as the product of an individual's innate conformity (α) and environmental influence (E) ($P = \alpha E$), and I as the product of innate deliberation (δ), cognitive habits (C), and social responsibility (R) ($I = \delta CR$). This paper discusses the theoretical validity of this model and its potential applications in self-metacognition, education, information literacy, and organizational design. It aims to provide a theoretical foundation (a "springboard for thought") for future empirical research.
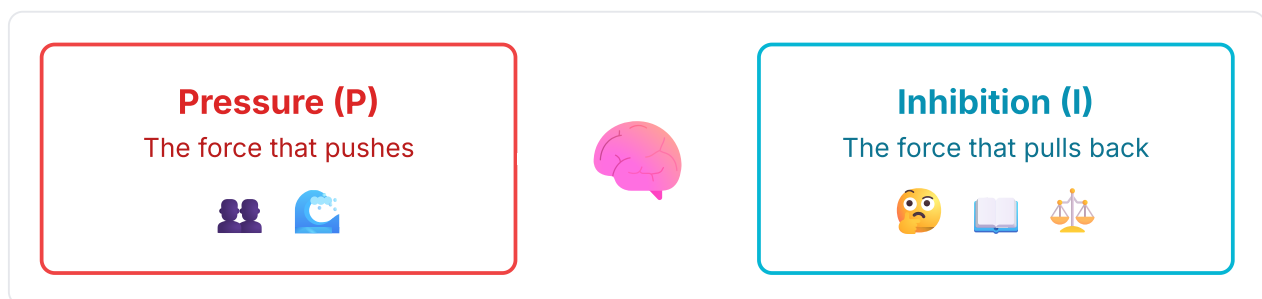
1. Introduction

In contemporary society, the proliferation of digital technologies, represented by social networking services (SNS), has dramatically increased the speed and volume of information transmission. Such an information environment has a profound impact on individual decision-making processes. Faced with the need to make quick judgments from a vast amount of information, humans often bypass meticulous analysis and logical reasoning, tending to rely on intuitive and convenient thought processes, known as "cognitive shortcuts" (heuristics).

This phenomenon, which could be described as "shallowness of thought," is often discussed as a characteristic of the younger generation, known as digital natives. However, this paper reframes the issue not by attributing it to a generation, but from the perspective of the influence of the surrounding "environment" on thinking styles. The starting point of this research is the hypothesis that any individual, regardless of generation, may fall into similar thinking patterns when placed in a specific environment. The purpose of this paper is to describe the mechanism by which these "cognitive shortcuts" are triggered and to propose a conceptual model, the "Digital Communication Criticality Model," to predict their probability of occurrence. Through this model, we aim to visualize the cognitive traps that individuals and society are prone to fall into and to build a theoretical foundation for exploring measures to make better decisions.

2. The Proposed Model

The "Digital Communication Criticality Model" proposed in this paper assumes that the likelihood of cognitive shortcuts (Heuristics: H) is determined by the dynamic balance between the "Pressure (P)" that promotes such thinking and the "Inhibition (I)" that suppresses it.

$$H = P - I$$

A higher value of H indicates a state where an individual is more likely to bypass logical thinking and be swayed by intuition, emotions, and surrounding opinions. Conversely, a low or negative value of H indicates a state where inhibition surpasses pressure, leading to careful and deliberate judgment.

2.1. Components of Pressure (P)

Pressure (P) is considered to arise from the interaction of an individual's internal characteristics and the external environment, defined by the following equation:

$$P = \alpha \times E$$

α (Alpha): Innate Conformity - The inherent nature of humans as social beings to align themselves with the opinions and norms of their group. This is positioned as a near-universal constant variable, regardless of generation or culture.

E (Epsilon): Environmental Influence - The intensity of the pressure from the individual's information environment. This includes the volume, speed, and interactivity of information, as well as functional aspects of SNS that encourage conformity, such as "likes" and retweets. This value tends to increase in modern digital environments.

2.2. Components of Inhibition (I)

Inhibition (I) is the power that supports deliberate judgment, formed by an individual's thinking style and social context, defined by the following equation:

$$I = \delta \times C \times R$$

δ (Delta): Innate Deliberation - The inherent nature of an individual to consider matters from multiple angles and with caution. It is assumed to be an internal, universal variable inversely correlated with impulsivity and reliance on intuition.

C (Chi): Cognitive Habits - The style of thinking acquired through experience with information contact during an individual's formative years. For example, individuals who have long been familiar with a print culture that requires systematic knowledge acquisition will have developed habits of processing information logically and structurally, resulting in a higher C value. On the other hand, this value may be relatively low if one grew up in a digital environment where fragmented and high-speed information processing is predominant.

R (Rho): Responsibility - The weight of responsibility an individual bears in a specific decision-making situation. It is proportional to the magnitude of the impact that a misjudgment would have on oneself and others. In situations where failure is not an option, such as a doctor's diagnosis or a corporate executive's decision, the value of R increases, thereby enhancing inhibition.

2.3. Normalization of Environmental Influence (E)

To enhance the model's practicality, it is desirable to handle each parameter within a range of 0 to 1. However, since "Environmental Influence (E)" has the characteristic of increasing exponentially in modern times, it needs to be scaled with other variables. Therefore, we propose to normalize E to a range of 0 to 1 by using logarithmic normalization on the raw environmental pressure index (E_raw), such as SNS contact time and information volume.

3. Applicability and Discussion

By expressing abstract concepts in mathematical formulas, this model can become a tool for multifaceted analysis and prediction of decision-making aspects in modern society.

3.1. Validation through Simulation

To understand the model's behavior, let's consider two hypothetical cases. Each parameter is set within a range of 0.1 to 1.0 (with E_raw potentially taking larger values).

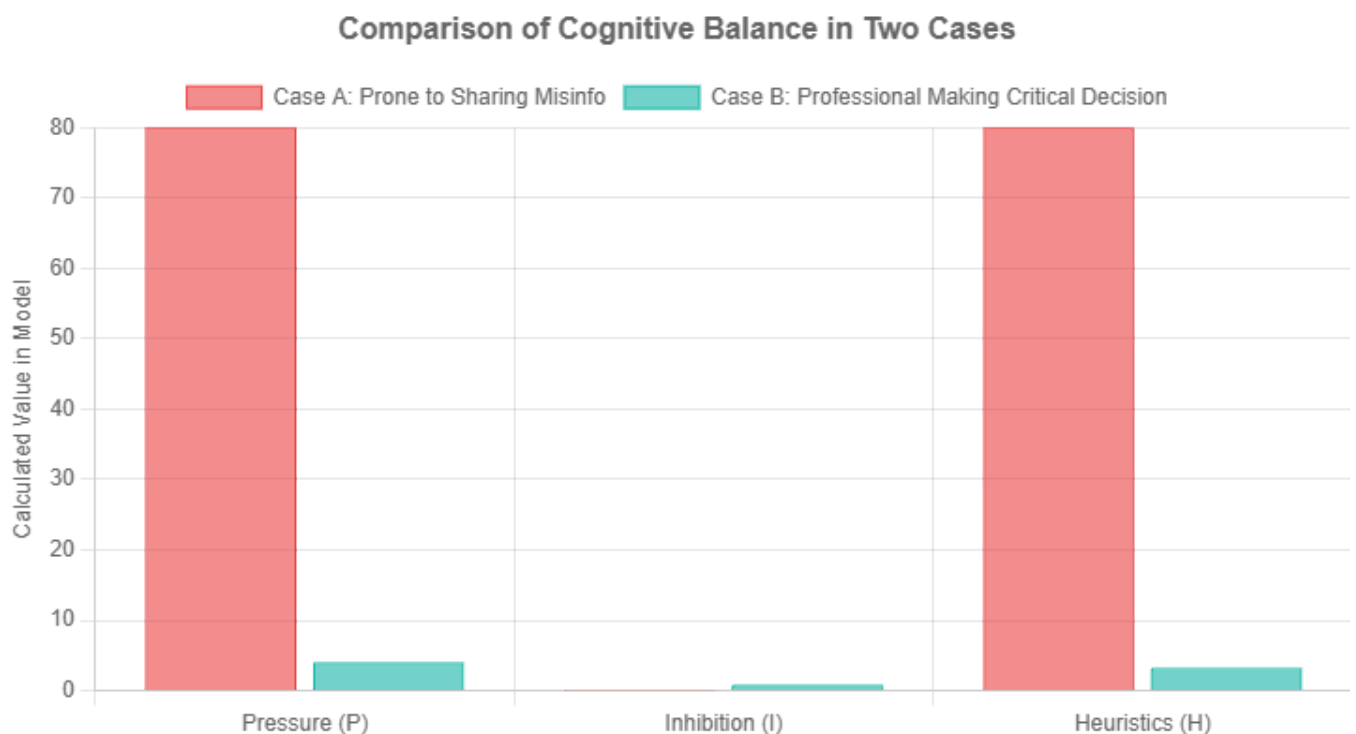**Case A: An individual prone to spreading uncertain information on SNS**

Parameters: $\alpha=0.8$, E_raw=100, $\delta=0.4$, C=0.2, R=0.1

Result: P=80, I=0.008, H=79.992. This indicates a state where inhibition is almost non-functional, and cognitive shortcuts are extremely likely due to overwhelming environmental pressure.

Case B: A professional making a critical business decision

Parameters: $\alpha=0.4$, E_raw=10, $\delta=0.9$, C=0.9, R=1.0

Result: P=4, I=0.81, H=3.19. This suggests that while environmental pressure exists, a high level of inhibition keeps the H value low, leading to deliberate judgment.

Comparison of Cognitive Balance in Two Cases

3.2. Real-World Applications

This model has potential applications in four domains, serving as a "dashboard for thinking" to improve our decision-making.

🧘 Metacognition

Objectively recognize when you are susceptible to shortcuts and prevent impulsive actions.

🎓 Education

Provides hints on how to cultivate "thinking power" (Inhibition) in the next generation.

Information Literacy

See through the structure of how fake news and misinformation appeal to our emotions.

System Design

Helps in creating mechanisms for wise collective decision-making in organizations.

4. Conclusion and Future Work

This paper has proposed the "Digital Communication Criticality Model" as a theoretical framework to explain individual decision-making processes in the modern information environment. This model is an attempt to capture the phenomenon of "cognitive shortcuts" not as a generational issue, but as a universal dynamic arising from the interaction between the environment and the individual, and to represent its structure mathematically.

At present, this model is a speculative hypothesis, and empirical research is essential to verify its validity. Future tasks include the operational definition and development of reliable and valid scales for measuring each parameter of the model (α, δ, C, R, E). The survey mentioned in the original blog post is considered a first step in this direction. Secondly, it is necessary to collect data using the developed scales to verify the predictive validity of the model. This will require analyzing the correlation with specific decision-making behaviors, such as the actual spreading of disinformation or purchasing behavior. It is hoped that this model will serve as an aid to understanding human thinking styles in a complex modern society and act as a "springboard for thought" to inspire further research.

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