

Six Thinking Hats strategy and employee skills: The mediating role of leadership style in hotels of the Aqaba Special Economic Zone

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Abstract: Sustained service quality in the hospitality industry rests on the cognitive and behavioral capabilities of front-line employees, and effective leadership is widely understood to shape how those capabilities develop. Structured cognitive frameworks have been proposed as tools to strengthen workforce skills, yet the conditions under which such frameworks translate into measurable skill gains remain unclear. This study examines the effect of Edward de Bono's Six Thinking Hats strategy on employee skill development in hotel service departments within the Aqaba Special Economic Zone (ASEZ) in Jordan, treating leadership style as a mediating variable. A quantitative cross-sectional survey was administered to 350 administrative and non-administrative employees across 19 eco-friendly hotels operating in ASEZ, selected through stratified random sampling.

Data was analyzed using Partial Least Squares Structural Equation Modelling in SPSS and SMART-PLS, with 5,000 bootstrap replications used to test direct and indirect effects. Three hypotheses were tested. The Six Thinking Hats strategy produced a statistically significant positive effect on employee skills ($\beta = 0.184$, $p < 0.001$), supporting the first hypothesis. The strategy did not directly influence leadership style ($\beta = 0.065$, $p = 0.190$), disconfirming the second hypothesis. Leadership style significantly mediated the relationship between the strategy and employee skills (indirect $\beta = 0.052$, $p = 0.035$; 95% confidence interval 0.009 to 0.104), supporting the third hypothesis and confirming an indirect causal pathway. The findings indicate that cognitive interventions alone are insufficient; their effect on workforce capability is transmitted primarily through the prevailing leadership context. The study contributes to applied tourism and hospitality scholarship by clarifying the conditions under which structured cognitive training advances skill development, and offers practical implications for hotel managers, training designers, and tourism policymakers in tourism-dependent economies.

Keywords: Six Thinking Hats, employee skills, leadership style, mediation analysis, hospitality industry, Jordan.

Introduction

The growing demand for human resource development in the era of rapid information growth and technological advancement has positioned employees as the most valuable asset of modern organizations. Human resources represent both an economic and social foundation for sustainable development, particularly in tourism-dependent economies (Aithal and Kumar, 2017; Senathip et al., 2017; Seyoum et al., 2021). Within the hospitality industry, service quality depends heavily on the cognitive, behavioral and adaptive capabilities of front-line staff. Continuous training and the application of structured thinking frameworks have therefore become essential to maintain competitiveness (Khalili, 2016; Aftab et al., 2023). Among these frameworks, the Six Thinking Hats technique developed by Edward de Bono has been associated with improved problem-solving and creative competence in service sectors (Azeez, 2016).

Edward de Bono (1985) introduced the Six Thinking Hats as a structured cognitive method that separates different modes of thought, enabling teams to examine problems systematically and reduce conflict during decision-making. Recent research suggests that the effectiveness of such cognitive frameworks depends substantially on the marketing and leadership context in which they are applied (Sangkaworn and Mujtaba, 2010). Leadership style mediates the relationship between cognitive tools and behavioral outcomes by shaping employee engagement, motivation and willingness to adopt new

methods (Al-Kazemi et al., 2025). The present study examines this mediating role within hotels operating in the Aqaba Special Economic Zone (ASEZ), where hospitality services are central to Jordan's tourism economy.

Problem Statement

Contemporary working life is shaped by rapid change, intense competition and increasing demands for creative output (De Carlo, 2022). Such conditions require employees capable of innovation under economic pressure, including periods of inflation and global market disruption (Maqableh et al., 2023). Encouraging creativity, however, is only part of the challenge; understanding the mechanisms that activate it within organizations is equally important. Leadership style is one such mechanism, functioning as a catalyst that shapes how employees respond to dynamic challenges (Mujtaba, 2022; Limna and Kraiwant, 2023). Building on this premise, the study addresses three research questions: first, to what extent are the Six Thinking Hats strategies perceived to be implemented (executed) in hotel service departments in ASEZ; second, what is the relationship between the application of the Six Thinking Hats strategies and improvement of employee skill levels in those departments; and third, how do the Six Thinking Hats strategies influence employee skill development through the mediating effect of leadership style?

Theoretical and Practical Significance

Theoretically, this study extends the conceptual framework of the Six Thinking Hats strategy by examining its applicability in building employee skills and by incorporating leadership style as a mediating variable. It contributes to the literature on workplace empowerment and innovative work behavior (Al Daboub et al., 2024) and on the role of leadership in shaping the outcomes of cognitive frameworks. Practically, the research informs hotel managers, trainers and tourism policymakers about how Six Thinking Hats training combined with appropriate leadership styles can strengthen workforce performance (Gradwohl and Mujtaba, 2025; Mujtaba et al., 2025; Plangmarn et al., 2012). Three hypotheses are proposed: H1 — the Six Thinking Hats strategies correlate significantly with employee skill improvement; H2 — the strategies have a significant direct effect on leadership style; and H3 — leadership style mediates the relationship between the strategies and employee skill development.

Literature Review

The Six Thinking Hats Framework

Edward de Bono, drawing on his medical background and his observations of group interaction, developed the Six Thinking Hats as a remedy to adversarial discussion. He observed that in most debates participants commit to a position and defend it stubbornly, producing conflict rather than insight (de Bono, 1985). The Six Thinking Hats restructure this dynamic by assigning each participant a defined thinking mode at a given time (Barreto and Mayya, 2024). The metaphor of colored hats represents distinct cognitive roles, with the group thinking in parallel rather than in opposition. Kant et al. (2025) note that this restructuring converts static disagreement into constructive output. By separating creativity, criticism and decision-making, the conversation becomes more focused and the outcome more usable (Sibian and Ispas, 2021; Paradinas-Márquez et al., 2023).

Characteristics of the Six Thinking Hats

Each hat performs a specific cognitive function. The White Hat focuses on neutral, data-driven thinking, asking what information is available and what remains unknown. Jawabreh and Al-Sarayrah (2017) describe this mode as direct and statistical. The Red Hat allows expression of feelings, intuition and emotional reactions without requiring justification (Jawabreh, 2020). The Black Hat encourages cautious and critical evaluation, identifying risks and potential obstacles before decisions are taken (Kim and Brymer, 2011). The Yellow Hat highlights benefits, opportunities and positive outcomes that may be overlooked in risk-averse discussions. The Green Hat stimulates creativity, generating alternative ideas and exploring "what if" scenarios. The Blue Hat manages the thinking process itself, organizing discussion, synthesizing perspectives and guiding the group toward resolution.

Application of the Six Thinking Hats in Service Settings

In practice, the Six Thinking Hats may be applied in two ways. Individual use involves adopting a single hat for a defined short-term task, such as drafting a report or chairing a meeting. Sequential use involves moving through several hats in a chosen order to examine a topic from multiple perspectives (Gupta and Bhattacharya, 2015). The reported benefits include the development of quality systems, reduction of conflict, improvement of work methods and enhanced effectiveness of meetings and discussions. The method is flexible enough to fit different organizational levels and roles, and tends to improve communication, support creativity and lift the overall quality of thinking and performance. Hotel service departments increasingly adopt the framework to train employees in parallel thinking and structured problem-solving. Each hat represents a specific cognitive mode, and team members metaphorically "change hats" as they move from one thinking style to another during discussion. Patre (2017) notes that focusing on one hat at a time does not exclude other perspectives; it allows each angle to be addressed systematically.

Leadership Style as A Mediating Variable

Administrative leadership shapes both professional and behavioral competencies of hotel employees (Helalat et al., 2023), with effects amplified in tourism-driven economies (Tidtichumrernporn et al., 2010). Wang et al. (2021), studying five-star hotels in Aqaba, reported a statistically significant relationship between leadership style and job satisfaction, which maps onto employees' skill development and capacity to handle responsibilities (Park et al., 2021). Participatory and transformational leadership styles are particularly effective in motivating employees and supporting continuous learning through inclusionary means (Khalili, 2016; Uru et al., 2024). Both styles create environments conducive to skill growth in communication, decision-making and problem-solving, especially in workplaces shaped by digital transformation (Nafei et al., 2025; Mujtaba, 2025; Mujtaba and Lawrence, 2024). Xu et al. (2022) confirmed that transformational leadership combined with high emotional intelligence supports both functional and psychological competencies among hotel employees. Local reports from the ASEZ Authority indicate that hotels combining regular training with participatory leadership achieve higher employee performance and guest service quality (Elshaer et al., 2023).

Theoretical Framework

The relationships proposed in this study are grounded in two complementary theoretical perspectives that together explain how a structured cognitive method becomes embodied in employee skills and why leadership style occupies a mediating position. The first is Social Cognitive Theory (Bandura, 1986), which holds that much human capability is acquired through observational learning, modelling and the development of self-efficacy rather than through direct instruction alone. Viewed through this lens, the Six Thinking Hats strategy supplies a shared cognitive vocabulary and a set of observable thinking behaviors that employees can model; as staff observe the structured separation of informational, emotional, cautionary, optimistic, creative and managerial modes of thought, and experience early success in applying them, their self-efficacy and their communication, problem-solving and creative skills are progressively strengthened.

The second perspective is Leader-Member Exchange (LMX) theory (Graen and Uhl-Bien, 1995), which conceptualizes leadership as a relational process built on the quality of the exchange between leaders and their team members. LMX clarifies why the effect of a cognitive method is unlikely to be uniform across a department: where exchange relationships are of high quality, leaders model, reinforce and legitimize the structured-thinking behaviors, allocate the resources and psychological safety needed to practice them, and thereby act as the structural pipeline through which the strategy is converted into skill, whereas where exchange quality is low the same method may fail to translate into observable competence. Taken together, Social Cognitive Theory explains the mechanism of skill acquisition, while LMX explains the leadership conditions that channel it, providing the theoretical justification for treating leadership style as the mediating variable in the conceptual model developed (Figure 1).

Methodology

The conceptual model treats the Six Thinking Hats strategy as the independent variable, employee skill development as the dependent variable and leadership style as the mediating variable. Placing leadership style as a mediator reflects the assumption that part of the effect of the Six Thinking Hats strategy is transmitted through the prevailing leadership style in the department. The relationship is therefore layered rather than linear, allowing both direct and indirect effects to be analyzed. Figure 1 illustrates the proposed framework.

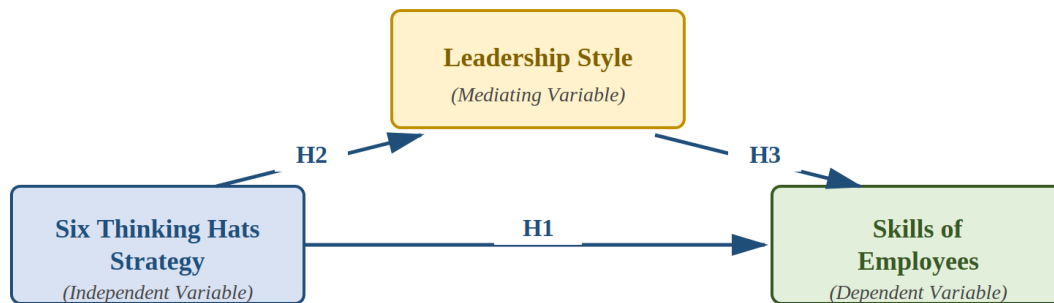


Figure 1. Conceptual framework of the study.

Research Design

This study adopts a quantitative cross-sectional research design to test the effect of the Six Thinking Hats strategy on employee skills in ASEZ hotel service departments and the mediating role of leadership style. Primary data were collected from administrative and non-administrative employees across 19 hotels operating in ASEZ during 2024. Secondary data were drawn from a review of prior studies in related thematic areas. Descriptive statistics provided an initial overview, while causal relationships were modelled using SPSS and SMART-PLS, which allowed the mediating role of leadership style to be examined within the conceptual framework.

Population and Sample

The target population comprises administrative and non-administrative employees working in hotels within ASEZ. According to the Jordanian Ministry of Tourism, ASEZ hotels employed 17,250 staff during the 2024 data collection period. A sample of 350 respondents was determined using established sampling tables for finite populations, with questionnaires distributed through stratified random sampling across the entire ASEZ region. Strata were defined by hotel category and department type to ensure representation across the workforce. The figure of 350 represents the final, valid sample retained for analysis: questionnaires were administered across the 19 eco-friendly hotels operating in the zone, and responses that were incomplete or inconsistently completed were screened and excluded before the 350 usable responses were analyzed.

Measurement Instrument

The independent variable, the Six Thinking Hats strategy, was measured across five indicator items reflecting the thinking modes defined by de Bono (1985). The dependent variable, employee skill development, was operationalized through six indicators covering communication, problem solving, creativity and adaptability, validated by expert review. Leadership style was operationalized through four items adapted from established assessment models capturing transformational, transactional and participative leadership characteristics. All items used a five-point Likert scale ranging from "strongly disagree" to "strongly agree". This measurement design enabled the analysis of both direct and indirect effects within the proposed framework.

The questionnaire was administered using two complementary modes to maximize coverage across departments and shift patterns: physical, hand-delivered paper copies distributed to frontline staff in the front-office, food and beverage, and housekeeping departments, and an online version delivered through Google Forms. The instrument was originally developed in English and translated into

Arabic using the back-translation procedure recommended by Brislin (1970): an independent bilingual expert translated the items into Arabic, a second bilingual expert translated them back into English, and the two English versions were compared and reconciled to ensure conceptual equivalence for frontline employees in Jordan. Prior to the main data collection, a pilot study was conducted with 30 respondents to verify the clarity, wording and reliability of the items; all constructs returned Cronbach's alpha values above 0.70, confirming the internal consistency of the instrument before the full survey was launched.

Data Analysis

Data analysis was conducted in SPSS and SMART-PLS using Partial Least Squares Structural Equation Modelling (PLS-SEM). Following Hair et al. (2014), the measurement model was first assessed for internal consistency, indicator reliability, convergent validity and discriminant validity. The structural model was then evaluated using bootstrapping with 5,000 replications to test path coefficients, R^2 values, f^2 effect sizes and the significance of direct and indirect effects. Mediation was tested using the bootstrap procedure recommended by Preacher and Hayes (2008). In addition, because all constructs were measured with a single self-report instrument completed by the same respondents, the potential for common method bias was assessed using the full collinearity procedure recommended by Kock (2015), in which the inner variance inflation factor (VIF) values of all constructs are examined against the conservative threshold of 3.3.

Findings

Measurement Model Assessment

Internal consistency and reliability of the constructs were assessed using indicator loadings, composite reliability (CR), average variance extracted (AVE) and Cronbach's alpha (Hair et al., 2014). The outer loadings of all indicators exceed the recommended threshold of 0.70. Table 1 summarizes the reliability and validity statistics.

Table 1. Measurement model assessment results.

Construct	Item	Loading	CR	AVE	Cronbach's α
Six Thinking Hats Strategy	TC1	0.790	0.907	0.665	0.875
	TC2	0.808			
	TC3	0.827			
	TC4	0.845			
	TC5	0.802			
	GR1	0.859	0.921	0.747	0.887
Leadership Style	GR2	0.874			
	GR3	0.894			
	GR4	0.827			
	ENS1	0.831	0.925	0.676	0.905
	ENS2	0.846			
Skills of Employees	ENS3	0.767			
	ENS4	0.811			
	ENS5	0.856			
	ENS6	0.817			

Composite reliability values for the three constructs (0.907, 0.921, 0.925) exceed the 0.70 threshold, confirming internal consistency. Average variance extracted values (0.665, 0.747, 0.676) exceed

0.50, supporting convergent validity. Cronbach's alpha values (0.875, 0.887, 0.905) also exceed the 0.70 benchmark, reinforcing the reliability of the constructs. Discriminant validity was tested using the Fornell-Larcker criterion (Table 2).

Table 2. Fornell-Larcker discriminant validity test (diagonal values are $\sqrt{\text{AVE}}$).

Construct	Leadership Style	Six Thinking Hats	Skills of Employees
Leadership Style	0.890	—	—
Six Thinking Hats Strategy	0.771	0.850	—
Skills of Employees	0.502	0.401	0.870

The square root of AVE for each construct (diagonal) exceeds its correlations with other constructs (off-diagonal), confirming discriminant validity. All three constructs are therefore sufficiently distinct, and the measurement model is suitable for structural model analysis.

Structural Model Findings

The structural model was evaluated using PLS-SEM with 5,000 bootstrap replications (Hair et al., 2014). Figure 2 illustrates the internal architecture of the model, showing path coefficients, p-values and R^2 values for the endogenous constructs.

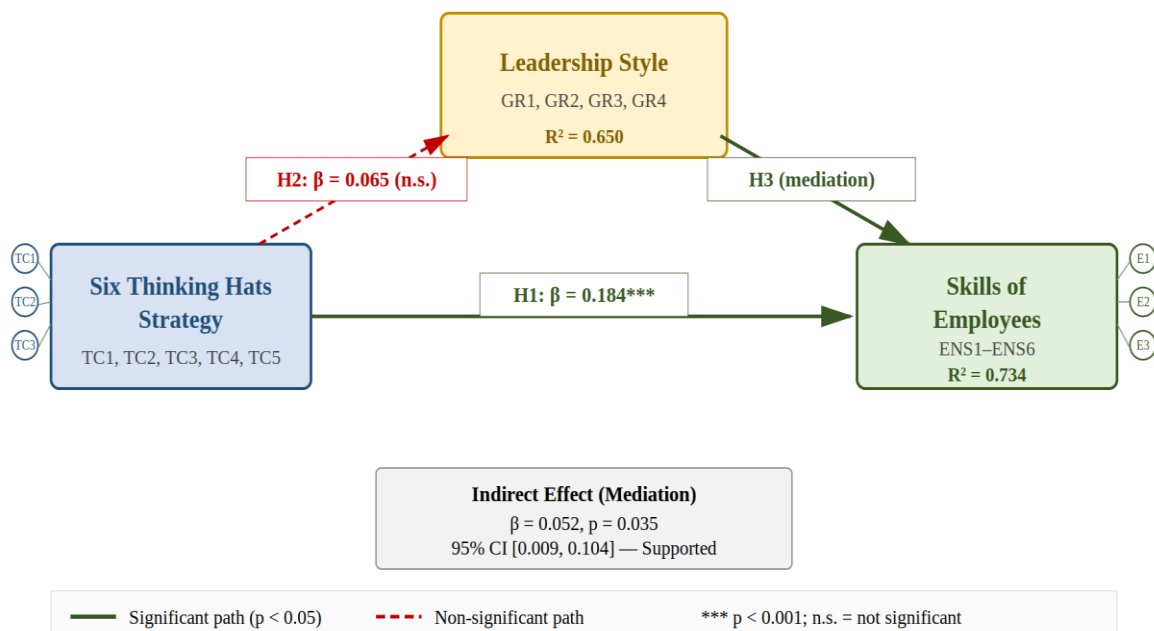


Figure 2. Internal architecture of the model (PLS-SEM results).

The coefficient of determination (R^2) values for the endogenous constructs are presented in Table 3.

Table 3. Coefficient of determination (R^2) of endogenous variables.

Endogenous Variable	R^2	Adjusted R^2	Predictive Relevance
Skills of Employees	0.734	0.733	Substantial
Leadership Style	0.650	0.646	Substantial

Employee skills ($R^2 = 0.734$) and leadership style ($R^2 = 0.650$) demonstrate substantial explanatory power, indicating that 73.4% of the variance in employee skills and 65.0% of the variance in

leadership style are explained by the model. Adjusted R² values remain close to R² values, confirming that the model is not overfitted.

Table 4. Effect size (f²) of exogenous constructs on endogenous variables.

Path Relation	f ²	Effect Size
Six Thinking Hats Strategy → Skills of Employees	0.124	Medium
Leadership Style → Skills of Employees	0.870	Large

Effect sizes follow Cohen's (1988) criteria. The Six Thinking Hats strategy exerts a medium effect on employee skills (f² = 0.124), while leadership style produces a large effect (f² = 0.870), confirming its central role in the model.

Hypothesis Testing

Path coefficients for the direct effects (H1 and H2) are reported in Table 5.

Table 5. Structural model results for direct effect hypotheses.

H	Path	β	SD	t	p	Decision
H1	Six Thinking Hats → Skills of Employees	0.184	0.054	3.491	< 0.001	Supported
H2	Six Thinking Hats → Leadership Style	0.065	0.049	1.342	0.190	Not Supported

H1 is supported (β = 0.184, t = 3.491, p < 0.001), indicating a statistically significant positive effect of the Six Thinking Hats strategy on employee skills. H2 is not supported (β = 0.065, t = 1.342, p = 0.190), suggesting that the strategy does not directly affect leadership style but may operate through other mechanisms.

Mediation was tested using the bootstrap procedure recommended by Preacher and Hayes (2008). The indirect effect of the Six Thinking Hats strategy on employee skills through leadership style is reported in Table 6.

Table 6. Bootstrap mediation analysis for the indirect effect (H3).

H	Indirect Path	β	p	BC 95% CI LL	BC 95% CI UL	Decision
H3	Six Thinking Hats → Leadership Style → Skills of Employees	0.052	0.035	0.009	0.104	Supported

H3 is supported. The indirect effect of the Six Thinking Hats strategy on employee skills through leadership style is statistically significant (β = 0.052, p = 0.035), and the bias-corrected 95% confidence interval (0.009 to 0.104) does not include zero. This finding confirms that leadership style mediates the relationship between the Six Thinking Hats strategy and employee skills, transmitting a meaningful portion of the strategy's effect to workforce competencies.

Discussion

The study provides empirical support for two of the three hypotheses. The Six Thinking Hats strategy directly enhances employee skills in ASEZ hotel service departments, consistent with prior literature suggesting that structured cognitive frameworks improve communication, problem-solving, creativity and adaptability (de Bono, 1985; Patre, 2017). The non-significant direct effect on leadership style (H2) indicates that the strategy does not reshape leadership behavior immediately or directly; rather, leadership operates as an existing organizational characteristic that channels the effect of the cognitive intervention. The supported mediation hypothesis (H3) confirms that

participatory and transformational leadership styles transmit the effect of the Six Thinking Hats to employees by creating environments that encourage the adoption of cognitive tools (Subramaniam et al., 2023). The large effect size for leadership style ($f^2 = 0.870$) emphasizes its central role in shaping skill outcomes.

These findings extend prior research by clarifying the conditions under which cognitive interventions translate into workforce competencies. They also align with broader work on transformational leadership and innovation (Khalili, 2016; Harasis et al., 2024), which highlights that leadership functions as the channel through which workplace interventions become behavioral change. From a managerial perspective, the results suggest that hotel managers in tourism-dependent economies should integrate cognitive training with leadership development to maximize organizational performance. Investing in Six Thinking Hats training alone may produce only moderate skill gains; coupling it with deliberate cultivation of participatory and transformational leadership practices is likely to produce considerably larger effects on service quality and workforce competency.

Conclusion

This research demonstrates that the Six Thinking Hats strategy contributes meaningfully to employee skill development in hotel service departments within the Aqaba Special Economic Zone, with leadership style serving as a significant mediating variable. The measurement model shows strong reliability and validity, while the structural model exhibits substantial explanatory power ($R^2 = 0.734$ for employee skills; $R^2 = 0.650$ for leadership style). The mediating role of leadership style highlights the importance of pairing cognitive training with participatory and transformational leadership in service-oriented industries.

The findings hold practical implications for hotel managers, trainers and tourism policymakers. Integrating Six Thinking Hats training into employee development programs, while simultaneously cultivating participatory leadership practices, can strengthen service quality and workforce capability. For tourism-dependent regions such as ASEZ, where tourism contributes substantially to the regional economy, such integrated approaches may also support long-term sectoral competitiveness.

Limitations and Future Research

The study is limited to ASEZ, restricting generalizability to other regions or industries. Replication across diverse urban, rural and international settings would strengthen external validity. Data were collected through self-administered questionnaires, which may introduce social desirability bias; future research should incorporate qualitative methods such as interviews and observation. The study focused on transformational and participative leadership; future work could examine servant, ethical and situational leadership as alternative mediators. The cross-sectional design captures a single point in time; longitudinal research would better capture skill development over time. Finally, the Six Thinking Hats were treated as a single construct; further studies could examine the differential contributions of each hat (emotional, creative, critical) to specific skill outcomes.

Declarations

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Ethical approval: All procedures involving human participants were conducted in accordance with institutional ethical guidelines. Informed consent was obtained from all participants, and confidentiality of responses was maintained throughout the study.

Use of artificial intelligence: The author(s) disclose that limited artificial intelligence assistance was used solely for language editing and proofreading. No AI tool was used to generate research content, analyze data, produce statistical results, develop the conceptual framework or write substantive arguments. All ideas, data analysis, interpretation and conclusions are the authors' own.

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