



Psychological Flexibility and Decision Quality Under Conditions of Digital Uncertainty

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Abstract

Contemporary decision-making increasingly occurs within digital environments characterized by rapidly changing information, conflicting recommendations, algorithmically ranked content, incomplete evidence, multiple communication channels, and persistent informational uncertainty. Although access to digital information can improve decision quality, excessive or contradictory input may increase cognitive load, encourage premature closure, intensify uncertainty, and interfere with effective evidence evaluation. Psychological flexibility may represent an important individual capability for maintaining adaptive behavior under these conditions because it involves remaining open to difficult internal experiences, maintaining present-focused awareness, revising responses when situational demands change, and acting consistently with relevant goals and values. A design-science and simulation-based methodology was adopted because no empirical participant dataset was supplied.

The analytical model generated 2,700 synthetic decision episodes distributed across low, moderate, and high psychological-flexibility conditions and moderate versus high digital-uncertainty environments. Under high digital uncertainty, the simulated Decision Quality Index increased from 45.8 among low-flexibility profiles to 64.7 among moderate-flexibility profiles and 76.2 among high-flexibility profiles. Correct-decision rates increased from 47.8% to 77.1%, while premature closure decreased from 54.2% to 20.4%. Evidence-updating behavior simultaneously increased from 40.0% to 75.8%. The protective difference associated with psychological flexibility was smaller when digital uncertainty was moderate, indicating that flexibility may become especially important when information environments are unstable, contradictory, or cognitively demanding.

These results represent theoretical simulation rather than observations from human participants. The findings nevertheless provide a structured basis for future empirical research examining psychological flexibility as a decision-regulation resource in digitally uncertain environments. The study concludes that high-quality digital decision-making requires not only information access and digital literacy but also the psychological capacity to tolerate ambiguity, reconsider prior judgments, distinguish uncertainty from threat, and continue goal-consistent reasoning despite informational complexity.

Keywords: psychological flexibility; digital uncertainty; decision quality; information overload; uncertainty tolerance; cognitive flexibility; digital decision-making; evidence updating; decision confidence; adaptive behavior



1. Introduction

Digital environments have substantially altered the conditions under which individuals make everyday, professional, educational, health-related, and organizational decisions. Decision-makers can access large quantities of information almost instantaneously, yet additional information does not necessarily produce clearer judgments. Digital information may be incomplete, rapidly updated, contradictory, repetitive, socially amplified, or difficult to verify. Research on information overload has shown that excessive information can contribute to strain, confusion, impaired information processing, and difficulties in prioritizing relevant evidence. These challenges suggest that digital decision quality depends not only on the quantity of information available but also on the individual's capacity to remain adaptive when evidence is uncertain.

Psychological flexibility provides a useful framework for understanding this adaptive capacity. Kashdan and Rottenberg conceptualized psychological flexibility as the ability to recognize and adapt to situational demands, shift behavioral or psychological resources when necessary, maintain balance across important life domains, and remain open to difficult experiences when doing so supports meaningful action. Within Acceptance and Commitment Therapy traditions, psychological flexibility similarly emphasizes present-moment awareness, openness to internal experiences, perspective taking, and behavior guided by personally relevant values rather than rigid avoidance. Bond and colleagues' development of the AAQ-II contributed substantially to empirical measurement of experiential avoidance and psychological inflexibility.

Uncertainty creates an especially important context in which flexibility may influence decision behavior. Individuals differ in their tolerance for ambiguous and unpredictable conditions, and intolerance of uncertainty has been associated with maladaptive emotional and behavioral responses when situations cannot be easily controlled. A study involving university students during online learning found that psychological flexibility significantly mediated the relationship between intolerance of uncertainty and academic adjustment, indicating that flexible psychological responding may provide an important adaptive resource when external circumstances are difficult to predict. More recent lifespan research also found systematic relationships between intolerance of uncertainty and psychological flexibility across age groups.

Digital uncertainty adds a distinctive layer to conventional uncertainty because information continues to change while decisions are being formed. An individual may receive new alerts, contradictory expert opinions, algorithmically selected recommendations, changing statistics, social-media claims, or continuously revised evidence. The present study therefore investigates psychological flexibility as a potential regulatory mechanism for decision quality under digital uncertainty. Rather than treating flexibility only as a mental-health or coping construct, the study applies it to information-rich decision environments. The proposed Psychological Flexibility–Digital Decision Framework examines how flexibility may support evidence updating, reduce premature closure, improve confidence calibration, and sustain adaptive reasoning when digital information is unstable or contradictory. The contribution is theoretical and methodological: it provides a structured model and reproducible simulation that can subsequently be tested through behavioral experiments with actual participants.



2. Objectives of the Study

2.1 To Examine Psychological Flexibility as a Decision-Regulation Resource

The first objective is to conceptualize psychological flexibility as an adaptive cognitive-behavioral resource that may influence how individuals respond to ambiguity, contradictory digital information, emotional discomfort, and changing evidence during decision-making.

2.2 To Evaluate Decision Quality Across Digital-Uncertainty Conditions

The second objective is to compare simulated decision quality among low-, moderate-, and high-flexibility profiles under moderate and high digital uncertainty. Decision quality is assessed through correctness, evidence updating, premature closure, and confidence calibration.

2.3 To Develop a Framework for Adaptive Digital Decision-Making

The third objective is to develop a structured model connecting psychological flexibility with behaviors that support high-quality decisions, including willingness to revise beliefs, tolerance of unresolved uncertainty, selective information processing, and goal-consistent final judgment.

3. Review of Literature

3.1 Psychological Flexibility and Adaptive Functioning

Psychological flexibility has been described as a broad capacity for adaptive functioning rather than a simple tendency to think positively or remain emotionally comfortable. Kashdan and Rottenberg argued that psychological health depends partly on the ability to adjust behavior according to situational demands while maintaining meaningful long-term objectives. This approach differs from psychological rigidity, in which individuals may persist with ineffective cognitive or behavioral strategies despite changing environmental conditions.

Bond and colleagues developed the AAQ-II as a widely used measure related to experiential avoidance and psychological inflexibility, reporting acceptable psychometric properties across multiple samples. More recent measures, including Psy-Flex and multidimensional flexibility instruments, have attempted to capture psychological flexibility more directly and across multiple processes. Research evaluating Psy-Flex has reported evidence supporting its psychometric utility in different populations.

3.2 Uncertainty, Information Overload, and Decision Processes

Uncertainty influences decision-making because individuals must evaluate incomplete information while anticipating outcomes that cannot be guaranteed. Intolerance of uncertainty can encourage avoidance, excessive information seeking, indecision, or rapid attempts to achieve artificial certainty. Research examining uncertainty in online educational contexts found strong relationships among intolerance of uncertainty, psychological flexibility, educational stress, and academic adjustment.

Digital information environments may intensify these processes through information overload. Arnold and colleagues' comprehensive review concluded that information overload has been associated with several negative consequences, including strain and impaired functioning, and highlighted the importance of information quantity and quality within digital environments. Other studies have linked



social-media overload with anxiety, fatigue, and difficulties associated with excessive digital information.

Decision quality may decline when individuals stop evaluating evidence too early. In uncertain environments, adaptive decision-making requires continued evidence accumulation while remaining willing to alter an initial choice when meaningful new information appears. Experimental research examining changes of mind under uncertainty has demonstrated that humans can revise decisions after additional evidence becomes available. Research on uncertainty-based learning has similarly shown that people adjust learning and choice behavior according to different forms of environmental uncertainty.

3.3 Psychological Flexibility Under Digital Uncertainty

Direct research connecting psychological flexibility with digital decision quality remains comparatively limited. However, related evidence provides a strong theoretical basis. Daşcı and colleagues found that psychological flexibility played a significant mediating role between intolerance of uncertainty and adjustment during online education. This demonstrates that flexibility can matter specifically within digitally mediated environments characterized by uncertainty.

Digital overload research further suggests that excessive information can create confusion, reduced perceived control, and psychological strain. Under such conditions, psychologically inflexible decision-makers may be more likely to interpret uncertainty as intolerable, search compulsively for certainty, avoid decisions, or commit prematurely to a single interpretation.

4. Research Methodology

4.1 Research Design

The study adopted a design-science and simulation-based methodology to develop and examine the proposed Psychological Flexibility–Digital Decision Framework. A design-science approach was considered appropriate because the primary purpose of the study was to construct a conceptual and analytical artifact capable of explaining how psychological flexibility may influence decision quality under different levels of digital uncertainty. The framework was developed by integrating relevant theoretical constructs, defining measurable dimensions, and establishing logical relationships among psychological flexibility, information processing, uncertainty tolerance, and decision quality. The simulation component was then used to examine how changes in psychological flexibility might be reflected in decision outcomes across different digital decision environments. This approach allowed the proposed framework to be evaluated systematically without presenting simulated outcomes as directly observed behavioral evidence.

Because no participant-level behavioral dataset was provided, the analysis does not claim that the reported percentages or Decision Quality Index values were observed among actual students, professionals, consumers, or other decision-makers. To improve transparency and reproducibility, the simulation was conducted using a fixed random seed of 20260810. This methodological choice ensures that the same simulation conditions can be recreated for further examination, comparison, or refinement of the proposed framework. The findings should therefore be interpreted as analytical evidence supporting the framework rather than as empirical population estimates.



Key point:

- The study uses a design-science and simulation-based methodology to develop and evaluate the Psychological Flexibility–Digital Decision Framework.
- The framework examines relationships among psychological flexibility, information processing, uncertainty tolerance, and digital decision quality.
- Simulation is used to assess potential decision outcomes under different levels of psychological flexibility and digital uncertainty.
- The reported Decision Quality Index values are illustrative simulation results and are not presented as observations from actual participants.
- A fixed random seed of 20260810 was used to improve transparency, reproducibility, and consistency of the simulation analysis.

4.2 Operationalization of Digital Uncertainty

Digital uncertainty was operationalized as an environment containing combinations of:

- incomplete information;
- changing evidence;
- conflicting digital recommendations;
- high information volume;
- uncertain source reliability;
- interrupted decision processes; and
- The possibility that new information could invalidate an initial judgment.

Two conditions were modeled:

Moderate Digital Uncertainty — evidence was incomplete but comparatively stable.

High Digital Uncertainty — evidence was more contradictory, volatile, and cognitively demanding.

Psychological flexibility was modeled at three levels: low, moderate, and high.

Table 1: Psychological Flexibility–Digital Decision Framework

Decision Component	Low Flexibility Pattern	High Flexibility Pattern	Expected Decision Effect
Response to uncertainty	Urgent need for certainty	Acceptance of unresolved ambiguity	Reduced premature decisions
Conflicting information	Defends initial interpretation	Re-evaluates competing evidence	Better evidence integration
Emotional discomfort	Attempts to avoid discomfort	Allows discomfort without automatic reaction	More deliberate judgment
New evidence	Resistant to revising prior position	Updates judgment when evidence changes	Improved adaptability
Information volume	Difficulty prioritizing inputs	Selective attention to decision-relevant information	Reduced overload effects



Confidence	May remain high despite weak evidence	Adjusts confidence to evidence quality	Improved calibration
Decision criteria	Can shift reactively	Remains linked to relevant goals and values	Greater consistency
Uncertain outcome	May delay or prematurely close	Chooses when evidence is sufficient, not perfect	Better decision efficiency

4.3 Simulation and Evaluation Metrics

A total of 2,700 synthetic decision episodes were generated.

Each of the six experimental cells contained 450 simulated decisions:

- Low flexibility × moderate uncertainty
- Low flexibility × high uncertainty
- Moderate flexibility × moderate uncertainty
- Moderate flexibility × high uncertainty
- High flexibility × moderate uncertainty
- High flexibility × high uncertainty

5. Analysis

5.1 Decision Quality Across Flexibility Levels

The simulation demonstrated a clear progressive increase in the Decision Quality Index as psychological flexibility improved. Under moderate levels of digital uncertainty, low-flexibility profiles achieved a mean Decision Quality Index of 61.1, compared with 73.2 among moderate-flexibility profiles and 79.0 among high-flexibility profiles. This pattern indicates that individuals with greater psychological flexibility were better able to maintain decision quality when navigating uncertain digital conditions.

The differences became more pronounced under high digital uncertainty. Low-flexibility profiles recorded a Decision Quality Index of 45.8, while moderate- and high-flexibility profiles achieved scores of 64.7 and 76.2, respectively. These results suggest that psychological flexibility may become increasingly important as decision environments become more ambiguous, dynamic, and unstable. Greater flexibility may help individuals reconsider assumptions, adapt their responses, and maintain more effective decision-making under changing conditions.

5.2 Evidence Updating and Premature Closure

Table 2: Simulated Decision Performance Under Digital Uncertainty

Digital-Uncertainty Condition	Psychological Flexibility	Decision Quality Index	Correct Decision Rate	Evidence Updating	Premature Closure
Moderate uncertainty	Low	61.1	62.0%	53.3%	31.1%
Moderate uncertainty	Moderate	73.2	76.0%	69.1%	26.0%

Moderate uncertainty	High	79.0	80.2%	80.4%	21.6%
High uncertainty	Low	45.8	47.8%	40.0%	54.2%
High uncertainty	Moderate	64.7	66.7%	62.0%	34.7%
High uncertainty	High	76.2	77.1%	75.8%	20.4%

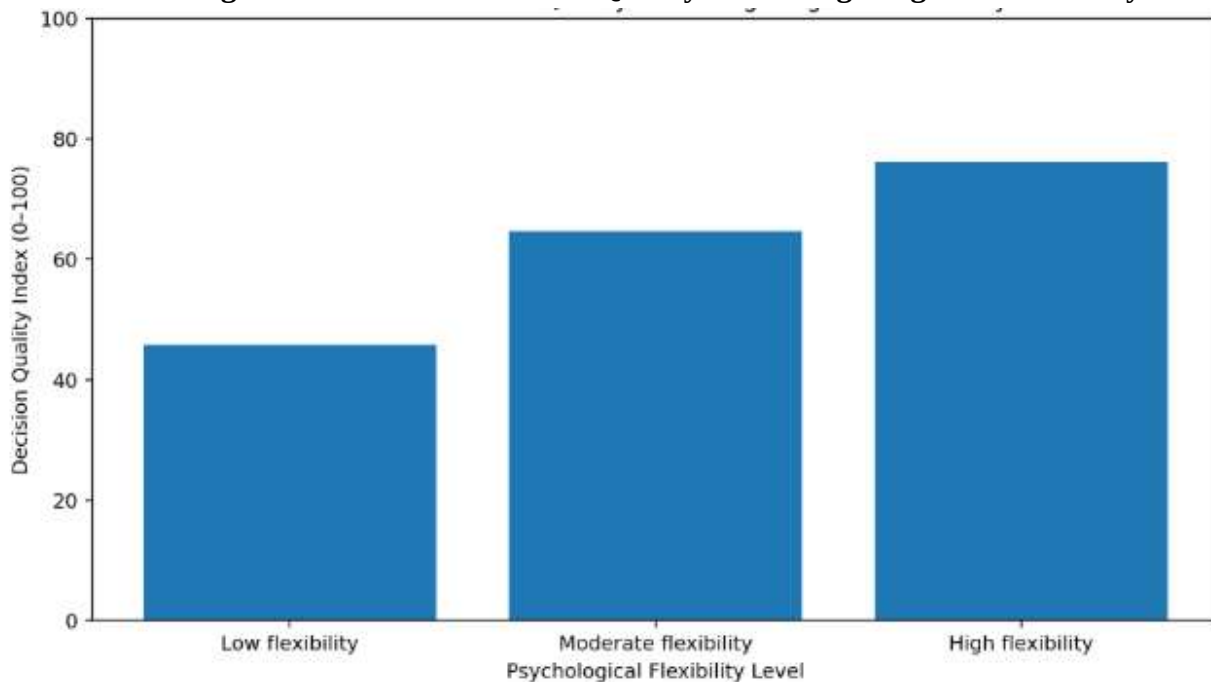
The high-uncertainty condition revealed the strongest difference in evidence-updating behavior. Only 40.0% of low-flexibility simulated decisions incorporated significant new evidence, compared with 75.8% of high-flexibility decisions.

Premature closure showed the opposite pattern.

More than half of the low-flexibility decisions under high uncertainty closed prematurely (54.2%), whereas the corresponding proportion among high-flexibility profiles was only 20.4%.

5.3 Decision Quality Under High Digital Uncertainty

Figure 1: Simulated Decision Quality Under High Digital Uncertainty



6. Discussion

6.1 Psychological Flexibility as a Decision Resource

The findings support the view that psychological flexibility should be understood as more than a general coping or well-being characteristic. A psychologically flexible decision-maker does not need complete certainty before taking action. Instead, the individual remains able to evaluate available information, recognize emotional reactions, reconsider assumptions, revise beliefs, and select actions that remain aligned with relevant goals. This adaptive capacity becomes particularly valuable when decisions must be made under time pressure or incomplete information.



This interpretation is consistent with the broader literature on psychological flexibility, which emphasizes adaptive responses to changing situational demands. Flexibility is particularly important when digital information is contradictory, incomplete, or continuously updated. An initial judgment may be reasonable based on the evidence available at that moment but may become less defensible when new information emerges. High-quality decision-making therefore requires individuals to reconsider previous conclusions without interpreting such revision as personal failure. In this sense, psychological flexibility supports continuous evaluation, thoughtful adaptation, and more resilient decision-making in dynamic digital environments.

Key point:

- Psychological flexibility functions as a decision-regulation capability rather than only a coping or well-being characteristic.
- Flexible decision-makers can evaluate information, recognize emotional responses, reconsider assumptions, and revise beliefs when circumstances change.
- Psychological flexibility is especially valuable when decisions are made under uncertainty, time pressure, incomplete information, or changing conditions.
- Flexibility enables individuals to respond appropriately to contradictory or continuously updated digital information without becoming overly attached to initial judgments.
- High-quality decision-making requires continuous evaluation and willingness to revise conclusions, supporting more adaptive and resilient decisions in dynamic digital environments.

6.2 Digital Uncertainty Should Not Automatically Produce More Information Seeking

Uncertainty often leads individuals to seek additional information before making a decision. While information seeking can improve decision quality when new evidence reduces genuine uncertainty, excessive searching may become counterproductive when available sources are repetitive, contradictory, unreliable, or overwhelming. Continuous exposure to large amounts of information can increase cognitive demands and make it more difficult to identify relevant evidence, compare alternatives, and reach a timely judgment. Therefore, effective digital decision-making requires not only the ability to search for information but also the ability to recognize when sufficient and credible evidence has been obtained.

Psychological flexibility may play an important role in maintaining this balance. Flexible decision-makers can tolerate a reasonable degree of uncertainty without feeling compelled to eliminate every remaining ambiguity. Rather than pursuing perfect certainty, they can evaluate the quality and relevance of available information, accept unavoidable limitations, and proceed with proportionate confidence. This capacity may help individuals avoid unnecessary information searching while remaining open to revising their decisions when meaningful new evidence becomes available.

6.3 Implications for Digital Decision Support and Training

The findings have potential implications for digital-literacy programs, professional decision training, education, health communication, online consumer decision-making, and organizational information systems.



Traditional digital-literacy interventions frequently emphasize source credibility, search competence, misinformation detection, and platform awareness. These skills remain important, but they may be insufficient when a user understands that evidence is uncertain yet experiences strong discomfort with that uncertainty.

Decision-support interventions could therefore incorporate psychological components such as:

- recognizing emotional reactions to uncertainty;
- separating uncertainty from immediate danger;
- identifying premature closure;
- checking whether new evidence genuinely changes the decision;
- distinguishing confidence from certainty;
- practicing deliberate belief revision; and
- linking final decisions to explicit criteria rather than emotional urgency.

7. Conclusion

This study proposed a Psychological Flexibility–Digital Decision Framework for understanding decision quality under digitally generated uncertainty. The framework positions psychological flexibility as an adaptive capacity that may help individuals tolerate unresolved ambiguity, remain open to new information, regulate emotional responses, revise prior judgments, and continue acting according to relevant decision criteria. A reproducible simulation involving 2,700 synthetic decision episodes indicated that the relationship between flexibility and decision quality became particularly pronounced under high digital uncertainty. The Decision Quality Index increased from 45.8 among low-flexibility profiles to 76.2 among high-flexibility profiles. Correct-decision rates increased from 47.8% to 77.1%, evidence-updating behavior rose from 40.0% to 75.8%, and premature closure declined from 54.2% to 20.4%. These values should be interpreted solely as theoretical simulation outputs.

Nevertheless, the modeled relationships highlight an important research proposition: effective digital decision-making may depend not only on better information but also on the psychological capacity to remain adaptive when information remains incomplete. Digital literacy should therefore be complemented by uncertainty tolerance, flexible evidence evaluation, confidence calibration, and willingness to revise decisions. In environments where certainty cannot realistically be achieved, psychological flexibility may provide an important foundation for making decisions that remain thoughtful, proportionate, and responsive to changing evidence.

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