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Examining The Impact of AI and Internet Ubiquity on Human Overthinking and Decision-Making Latency: An Empirical Study on Digital Overstimulation and Cognitive Rumination

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Abstract

The presence of artificial intelligence (AI) and internet technologies has brought about a tremendous change in terms of human cognition and decision-making processes. Exposures of individuals to AI enabled digital environments, online multitasking and internet use in general have raised questions with respect to cognitive overload, overthinking, and decision-making delay. This research project aims at investigating the effect of the AI phenomenon and the internet on digital overstimulation, cognitive ruminations, and decision-making delay in human subjects within the age range of 18 to 45 years. Quantitative methods will be employed involving tests and measures such as correlation and ANOVA. The findings indicate a strong positive correlation between digital overstimulation, dependency on AI, cognitive rumination, and delayed decision-making. This study suggests that excessive digital activities are a major source of mental exhaustion, recurring thought processes, and reduced cognitive efficiency. These findings show the importance of practicing digital balance and proper use of AI in today's world.

Keywords: Artificial Intelligence, Digital Overstimulation, Cognitive Rumination, Decision-Making Latency, Internet Ubiquity, Overthinking, Cognitive Load, AI Dependency.

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1. INTRODUCTION

The fast emergence of AI, digital communication means, and the Internet has revolutionized the manner in which people think, communicate, and take decisions in modern societies[1]. Such technology-enabled processes have become an integral part of human behavior, affecting both the cognitive as well as the affective dimensions of how humans think and process information. While the benefits of such technologies are undeniable, due to their efficiency, speed, and convenience, their heavy usage is linked with several disadvantages, such as cognitive overload, mental fatigue, overthinking, and even delaying in decision-making[2]. Therefore, the importance of understanding the effects of technology-enabled means of communication on human psychology and cognition cannot be overemphasized[3].

1.1 Background Information

AI technology and the internet have been deeply integrated into modern life and greatly affect human cognition and decision-making processes[4]. The ever-present use of social media, recommendation engines, chatbots, and online communication channels results in an environment of incessant exposure to and interaction with information through digital means[5]. Overexposure to these technologies causes digital overstimulation, cognitive overload, brain exhaustion, distraction, and poor decision making. As suggested by the theory of Cognitive Load, excess information in digital form increases cognitive load and decreases attention effectiveness[6].

AI-supported solutions are becoming more popular for making choices because of prediction capabilities and personalized recommendations. However, even though such systems help to save time and effort, the complete reliance on them might lead to less independent thinking and greater indecisiveness when choosing between alternatives[7]. Additionally, prolonged interaction with digital technology encourages cognitive reflection and overthinking. Despite the existing studies that address such aspects of AI support separately, there is little research that explores how the combination of the discussed factors affects overthinking and decision-making latency. Hence, this study aims to fill this knowledge gap[8].

1.2 Statement of the Problem

Increased involvement of technologies assisted by artificial intelligence, alongside constant Internet use, has resulted in the formation of mentally taxing conditions that include an abundance of information, algorithmic processing, and distractions[9]. These conditions can be considered contributors to overthinking, cognitive ruminations, mental exhaustion, and indecisiveness. Although the phenomenon of digital cognitive overload is a matter of concern, research into the connection between such overload and decision latency is scarce[10].

1.3 Objectives of the Study

1. To examine the impact of digital overstimulation on cognitive rumination among human participants.
2. To analyze the relationship between AI dependency and decision-making latency.
3. To evaluate the influence of internet ubiquity on overthinking behavior.
4. To investigate the mediating role of cognitive rumination between digital overstimulation and delayed decision-making.
5. To assess demographic variations associated with digital cognitive overload and decision-making behavior.

1.4 Hypotheses of the Study

H1: Digital overstimulation significantly increases cognitive rumination among participants.

H2: AI dependency positively influences decision-making latency.

H3: Internet ubiquity significantly contributes to overthinking behavior.

H4: Cognitive rumination significantly mediates the relationship between digital overstimulation and delayed decision-making.

2. METHODOLOGY

The methodology chapter outlines the process through which the researchers chose to study the effect of digital platforms enhanced by AI on overthinking and delays in decision-making among human subjects. In doing so, the researchers employed a quantitative methodology to explore the connections between digital stimulation, overthinking, and delay in decision-making.

2.1 Research Design

This research used a quantitative empirical research methodology that sought to explore the psychological and cognitive effects of AI-based digital environments with respect to overthinking and decision-making latency. The study utilized a cross-sectional analysis approach that examined the interrelationships between digital overstimulation, cognitive rumination, AI reliance, and decision-making delays.

2.2 Participants and Sample Details

A total of 180 human subjects were used for the research, having been purposively sampled. The sample was made up of university students, workers, researchers, and people who use the internet regularly. They ranged in age from 18 to 45 years old. Subjects who were not accustomed to using AI-powered digital systems were excluded from the study.

Inclusion Criteria

- Human participants aged between 18 and 45 years.
- Regular users of internet-based and AI-assisted applications.
- Participants willing to provide informed consent.

Exclusion Criteria

- Individuals diagnosed with severe neurological disorders.
- Participants with limited digital exposure.
- Incomplete questionnaire responses.

2.3 Instruments and Materials Used

This investigation relied on standardized scientific instruments in order to measure the variables relating to digital cognitive behavior. The instruments used included:

1. Digital Overstimulation Scale (DOS)
2. Ruminative Thought Style Questionnaire (RTSQ)
3. Decision-Making Latency Inventory (DMLI)
4. AI Dependency and Trust Scale
5. Structured Cognitive Fatigue Assessment Questionnaire

All instruments were constructed based on a five-point Likert scale starting from "strongly disagree" (1) to "strongly agree" (5). The reliability test revealed satisfactory internal consistency since the values of Cronbach's Alpha were above 0.80 for all instruments.

2.4 Procedure and Data Collection Methods

Data were gathered through online and offline survey techniques for three months. Before conducting the survey, the participants were apprised of the aims of the study and other issues of confidentiality and ethics concerning the study. Informed consent was sought from all participants for their participation in the research process.

The questionnaires measured several aspects of digital cognitive behavior, such as intensity of digital exposure, reliance on AI for cognitive behavior, tendency to ruminate, mental exhaustion owing to excessive internet usage, instances of overthinking, and difficulty in making decisions. The survey respondents were asked to fill out the questionnaires on the basis of their experience

with the internet and AI-assisted digital interfaces. The average time required to fill out the questionnaires varied from 20 to 25 minutes.

2.5 Data Analysis Techniques

Data collected was analyzed by Statistical Package for Social Sciences (SPSS). The statistical procedures used during the analysis were:

- Descriptive statistical analysis
- Pearson correlation analysis
- Multiple regression analysis
- Analysis of Variance (ANOVA)
- Mediation analysis
- Hypothesis testing

The significance level for all statistical tests was maintained at $p < 0.05$.

3. RESULTS

The results of this study include statistical findings that are derived from the empirical study that has been done on 180 human subjects. In conducting this study, the objective was to look into the correlations between digital overstimulation, cognitive rumination, AI reliance, ubiquity of the internet, and decision-making latency in AI-driven digital spaces. This study made use of various statistical methods, such as descriptive statistics, correlation, ANOVA, regression analysis, and mediation. From the results obtained, there is a high level of correlation between digital overstimulation and problems with cognition and decision-making.

Table 1: Descriptive Statistics of Major Variables

Variable	Mean	Standard Deviation
Digital Overstimulation	3.94	0.68
Cognitive Rumination	3.81	0.64
AI Dependency	3.72	0.70
Decision-Making Latency	3.89	0.69

Descriptive statistics for the key variables used in the study are shown in Table 1 below. Digital overstimulation had the highest mean score (Mean = 3.94, SD = 0.68), while decision-making

latency had the second highest mean (Mean = 3.89, SD = 0.69). Cognitive rumination had a mean score of 3.81 and a standard deviation of 0.64, while AI dependency had a mean score of 3.72 and a standard deviation of 0.70. These results suggest that the respondents experienced cognitive overload, cognitive rumination, and decision-making delay as a result of constant exposure to AI-assisted digital environment.

Table 2: Correlation Matrix Among Study Variables

Variables	**Digital Overstimulation**	**Cognitive Rumination**	**AI Dependency**	**Decision-Making Latency**
Digital Overstimulation	1	0.71**	0.63**	0.72**
Cognitive Rumination	0.71**	1	0.68**	0.76**
AI Dependency	0.63**	0.68**	1	0.69**
Decision-Making Latency	0.72**	0.76**	0.69**	1

p < 0.01

Table 2 represents the correlation matrix for all variables used in the research. From the results, there were significant positive correlations among all variables. The highest correlation coefficient was obtained between cognitive rumination and decision-making latency (r = 0.76). This suggests that the repetitive nature of thoughts makes significant contributions to the delay in making decisions. On the other hand, digital overstimulation correlated strongly with cognitive rumination (r = 0.71) and decision-making latency (r = 0.72).

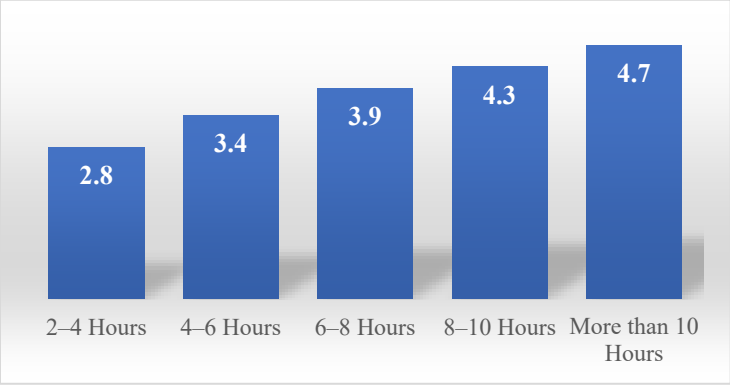

Figure 1: Average Daily Screen Time and Cognitive Fatigue Levels Among Participants

As illustrated by Figure 1 below, higher levels of cognitive fatigue were associated with increased screen time per day. Those who used their devices for more than 10 hours per day had the highest level of cognitive fatigue score (4.7), compared to those who spent 2-4 hours of screen time and showed lower levels of cognitive fatigue (2.8).

Table 3: ANOVA Analysis of Cognitive Overload and Decision-Making Latency

Source of Variation	F-value	Significance Level (p-value)
Age Categories	4.36	0.011
Occupational Groups	3.92	0.019
Internet Usage Duration	5.14	0.004

ANOVA analysis of cognitive load and delay in decision-making was conducted on three participant types. The greatest variation influence ($F = 5.14$; $p = 0.004$) occurred in terms of the internet usage period, which shows that prolonged usage causes serious cognitive load. There were statistically significant variations between age categories ($F = 4.36$; $p = 0.011$). These results show that younger people had greater cognitive load and fatigue compared to others. Occupational categories were also significantly different ($F = 3.92$; $p = 0.019$).

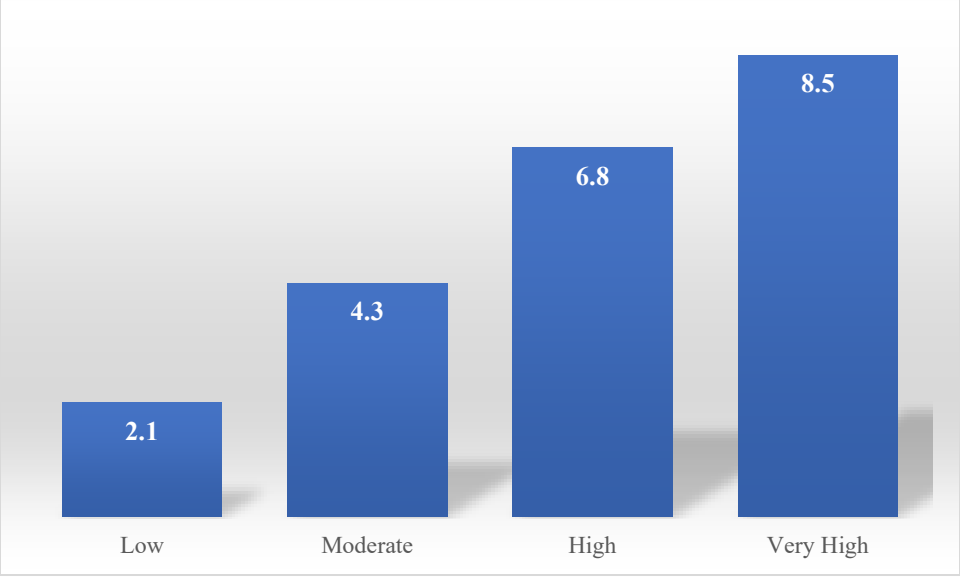

Figure 2: AI Dependency Levels and Average Decision-Making Delay

As shown by Figure 2, the higher level of AI dependency was related to the increased decision delay among the subjects. Subjects with low AI dependency had only 2.1-minute decision delay,

while those with high AI dependency experienced much higher delays, which amounted to 8.5 minutes. This result indicates that an over-reliance on AI-based decisions can decrease independent thinking abilities of a person.

3.1 Hypothesis Testing

The following hypothesis testing procedures were used to assess the hypotheses relating to digital overstimulation, AI dependency, cognitive rumination, and decision-making latency: regression analysis, correlation analysis, and mediation analysis.

Hypothesis 1 (H1): Digital overstimulation significantly increases cognitive rumination among participants.

Table 4: Impact of Digital Overstimulation on Cognitive Rumination

Variable Relationship	Beta Coefficient	t-value	p-value	Hypothesis Status
Digital Overstimulation → Cognitive Rumination	0.42	6.84	<0.001	Accepted

This is supported by Table 4 showing that digital over-stimulation plays a crucial role in cognitive rumination for subjects in the study. The value of the beta coefficient is 0.42, indicating that there is a significant positive impact. Statistical evidence supporting the results is obtained from the value of the t-test of 6.84 and p-value less than 0.001.

Hypothesis 2 (H2): AI dependency positively influences decision-making latency.

Table 5: Influence of AI Dependency on Decision-Making Latency

Variable Relationship	Beta Coefficient	t-value	p-value	Hypothesis Status
AI Dependency → Decision-Making Latency	0.34	5.92	<0.001	Accepted

Table 5 illustrates how AI reliance plays an important role in leading to delayed decision-making behavior. The value of beta of 0.34 shows a positive effect, and the t-value of 5.92 confirms the statistically significant result. Therefore, it is believed that higher levels of AI reliance led to lower decision-making confidence and higher hesitations.

Hypothesis 3 (H3): Internet ubiquity significantly contributes to overthinking behavior.

Table 6: Relationship Between Internet Ubiquity and Overthinking Behaviour

Variable Relationship	Correlation Coefficient (r)	p-value	Hypothesis Status
Internet Ubiquity → Overthinking Behaviour	0.72	<0.001	Accepted

From table 6, there is a significant positive association between internet prevalence and repetitive thinking tendencies with the correlation value being 0.72. This is statistically significant at p <0.001 indicating that constant internet access plays a significant role in repetitive thinking, information over-analysis, and cognitive overload.

Hypothesis 4 (H4): Cognitive rumination significantly mediates the relationship between digital overstimulation and delayed decision-making.

Table 7: Mediating Role of Cognitive Rumination Between Digital Overstimulation and Decision-Making Latency

Mediation Relationship	Indirect Effect	Standard Error	p-value	Hypothesis Status
Digital Overstimulation → Cognitive Rumination → Decision-Making Latency	0.44	0.05	<0.001	Accepted

As can be seen from Table 7, cognitive rumination is found to mediate the relationship between digital overstimulation and decision-making delay, as indicated by the indirect effect value of 0.44. Repetitive thoughts, therefore, represent a vital psychological factor through which digital overexposure leads to decision-making delay.

4. DISCUSSION

Interpretation of the results that have been achieved via statistical analysis is made in the discussion part, as well as elaboration of the significance of the results in the context of already available literature about digital cognition, AI-assisted environment, cognitive overload and behavior associated with decision making. Furthermore, the discussion part points out the practical implications of the study, its limitations, and directions for further research on the matter.

4.1 Interpretation of Results

Conclusions drawn from the current study show that excessive exposure to AI-driven digital settings is strongly associated with cognitive overload, overthinking tendency, and delay in decision-making for respondents. Continuous engagement in internet-based settings, algorithm-driven recommendations, notifications, and digital multitasking settings results in cognitive overload, thus hindering effective mental processing. It was established that overstimulation by digital technology significantly promotes cognitive rumination, thereby encouraging people to constantly think about different situations and reevaluate alternatives. Another notable influence of AI usage is decision-making delays as the use of excessive algorithm-driven suggestions hinders independent thinking and promotes hesitation during decision-making process. Cognitive rumination emerges as one of the major mediators between cognitive overload caused by digital technology and delays in decision-making.

4.2 Comparison with Existing Studies

The results obtained from this study can be seen in line with past research on the psychological and cognitive impact of technology and AI-enabled interfaces. Prior research had pointed out that heavy use of technology, multitasking online, and interactions with algorithms play a major role in cognitive overload, attention problems, fatigue, and decreased efficiency in decision making. In line with the findings obtained in this study, prior research has found cognitive rumination and digital distractions as some key outcomes of continued exposure to the Internet and reliance on artificial intelligence.

Table 8: Comparison of Present Study with Existing Literature

Authors and Year	Major Focus of Study	Key Findings	Relation with Present Study
Siemens et al. (2022)[11]	Human and artificial cognition	AI systems significantly influence cognitive processing and human learning behavior	Supports the present study's findings regarding AI influence on human cognition and decision-making
Skulmowski & Xu (2022)[12]	Cognitive load in digital learning	Excessive digital cognitive load reduces attention efficiency and mental clarity	Consistent with findings on cognitive overload and mental fatigue
Surbakti et al. (2024)[13]	Cognitive load theory in digital classrooms	Continuous digital exposure increases cognitive burden and distraction	Supports the relationship between digital overstimulation and cognitive rumination

Van Arum et al. (2025)[14]	Human-AI trust in decision-making	Excessive trust in AI systems affects independent decision-making ability	Aligns with findings regarding AI dependency and delayed decisions
Wu & Xie (2018)[15]	Digital distraction and cognitive control	Digital distraction impairs cognitive control and decision performance	Supports findings related to overthinking and decision-making latency

4.3 Implications of Findings

The findings from this research have major consequences on areas such as digital mental health awareness, human-AI interactions, productivity in the workplace, educational technology development, and cognitive well-being interventions. The findings of the experiment indicate that overexposure to digital environments powered by AI can harm one's psychological well-being and cognition. Hence, organizations and policy makers must encourage healthy practices in terms of digital environment exposure as an effort to reduce cases of mental exhaustion, overthinking, and slower decision making.

4.4 Limitations of the Study

However, despite these important results, the current research possesses some limitations that must be taken into account. First of all, due to the use of self-report questionnaires, there is a possibility of response bias and subjectivity. Secondly, the cross-sectional research design did not allow establishing direct cause-and-effect relationships. Thirdly, the sample consisted of only 180 individuals within 18-45 age range. Therefore, it was not representative for generalizing the results. Lastly, it is necessary to mention that the study concentrated on psychological and behavioral factors but ignored neurological aspects.

4.5 Suggestions for Future Research

Longitudinal studies in the future may consider the possible long-term consequences of AI usage and constant connectivity with the internet on human cognition. In addition, neurological and physiological signs that might arise due to digital overstimulation and cognitive exhaustion could be examined in further research. Moreover, comparative studies of decision-making in both AI-supported and non-AI-supported conditions would offer valuable insights into the psychological implications of using algorithms to make decisions. Possible approaches to overcoming cognitive rumination through intervention programs for cognitive rehabilitation and mental well-being could also be explored in future studies.

5. CONCLUSION

In the conclusion part, the main results obtained from the current study are reviewed and discussed regarding their importance in understanding the impact of AI-based digital worlds on human psychology and cognitions. This study assessed the impact of digital over-stimulation, AI dependency, prevalence of Internet in our daily lives, and cognitive rumination on over-thinking and decision-making delays by humans.

5.1 Summary of Key Findings

Results of the study showed that heavy use of AI-enabled digital systems is highly associated with cognitive overload, overthinking, and delayed decision-making among people. There was a positive correlation between digital overstimulation and cognitive rumination, while dependence on AI played a critical role in decision-making latency. Another key finding of the research was that prolonged exposure to the internet led to repetitive thought processes and cognitive tiredness, which hampers cognitive performance. Moreover, cognitive rumination acted as an intermediary variable between digital overstimulation and decision-making delays.

5.2 Significance of the Study

In terms of significance, the current research is important due to the fact that it brings forward some empirical information about the psychological consequences of becoming overly reliant on AI and the Internet in terms of cognition and decision-making behaviors of humans. Therefore, the conclusions made throughout the research can add value to the field of digital psychology, human-AI interaction, cognitive sciences, and behavioral technology studies in regard to the adverse effects of becoming too involved with digital technologies on one's psychological well-being.

5.3 Final Thoughts and Recommendations

However, the quick adoption of AI and internet-enabled technologies in our everyday lives has presented not only prospects but also psychological risks to society. Though AI-powered solutions enhance the quality of our actions and experiences, the over-reliance on such mentally stimulating environments could impact our cognitive focus, emotional well-being, and confidence while making decisions. Thus, people need to engage with technology appropriately and incorporate sufficient cognitive rest periods into their schedules to reduce mental exhaustion and constant overthinking.

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