The Effect of Perceived AI Ethical Risks on Social Media Fatigue: The Moderating Role of Nostalgia Proneness and Nostalgia Type

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Abstract

Addressing social media fatigue among users represents an important research topic in marketing. This study examines the influence of AI ethics risk perception on social media fatigue, drawing upon SSO theory to explain the mediating role of social connection in this relationship. Furthermore, it introduces nostalgia tendency and nostalgia types, elaborating on their moderating effects between AI ethics risk perception and social media fatigue. Questionnaire survey results demonstrate that AI ethics risk perception exerts a significant positive impact on social media fatigue, with this influence process being mediated by social connection. The moderating effect of nostalgia tendency is significant, such that the positive impact of AI ethics risk perception on social media fatigue weakens under high nostalgia tendency. Different nostalgia types also exhibit distinct moderating effects: collective nostalgia tendency, which emphasizes collectivity and society, significantly moderates the relationship between AI ethics risk perception and social media fatigue, whereby the positive effect of AI ethics risk perception on social media fatigue becomes weaker under higher collective nostalgia tendency; in contrast, individual nostalgia, which focuses on the self, shows no significant moderating effect. This study enriches theoretical research on AI ethics and social media fatigue, and practically assists AI and social media platforms in guiding users to evoke nostalgia or collective nostalgia to alleviate social media fatigue.

Full Text

The Impact of Artificial Intelligence Ethical Risk Perception on Social Media Fatigue—Based on the Moderating Effects of Nostalgia Tendency and Nostalgia Type

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Abstract

Addressing social media fatigue represents a critical issue in marketing research. This study investigates the influence of artificial intelligence (AI) ethical risk perception on social media fatigue, drawing upon Stress-Strain-Outcome (SSO) theory to explain the mediating role of social connection. Furthermore, we introduce nostalgia tendency and nostalgia type as moderators in the relationship between AI ethical risk perception and social media fatigue. Survey results demonstrate that AI ethical risk perception significantly and positively affects social media fatigue, with this relationship mediated by social connection. Nostalgia tendency significantly moderates this relationship: at higher levels of nostalgia tendency, the positive effect of AI ethical risk perception on social media fatigue weakens. Different nostalgia types exert distinct moderating effects. Collective nostalgia tendency, which emphasizes community and society, significantly moderates the relationship between AI ethical risk perception and social media fatigue—higher collective nostalgia tendency attenuates the positive effect. In contrast, personal nostalgia, focused on the individual self, shows no significant moderating effect. This research enriches theoretical understanding of AI ethics and social media fatigue, offering practical insights for AI and social media platforms to guide users toward nostalgic or collective nostalgic experiences as a means to reduce social media fatigue.

Keywords: Artificial intelligence ethical risk perception; Social connection; Social media fatigue; Nostalgia

1. Introduction

Social media platforms enable users to share opinions, insights, experiences, and perspectives, with their most distinctive feature being the empowerment of every individual to create and disseminate content (Cao, 2011). With the rapid advancement of information and communication technologies, social media has become an integral component of social relationship networks. According to the China Internet Network Development Statistics Report, as of June 2022, China' s internet user population reached 1.051 billion, with instant messaging users totaling 1.027 billion, accounting for 97.7% of all internet users. People increasingly rely on social media for interpersonal and community interactions, information acquisition, and entertainment, making these platforms essential

for daily communication. However, a countervailing trend has simultaneously emerged: social media fatigue, a phenomenon that continues to intensify (Hong & Duan, 2020). WeChat, China' s most widely used social media platform with over one billion users, exemplifies this issue. A 2020 report from iMedia Research revealed that overloaded social relationships, proliferating content, and numerous security vulnerabilities impose increasingly heavy social costs on users. In recent years, many users have exhibited diminished enthusiasm for social media, choosing to "go invisible," reduce their online presence, or even exit social media platforms entirely—a pattern of social media fatigue behavior that has become increasingly common (Lu et al., 2020). Consequently, investigating the mechanisms underlying social media fatigue is crucial for mitigating this behavior.

Existing research has extensively explored the antecedents of social media fatigue, primarily employing empirical methods across three levels: social media platform characteristics (Dhir et al., 2019; Zhang et al., 2016), user behaviors and psychology (Lee et al., 2014), and social environments (Ravindran et al., 2014). Most prior studies have focused on the Web 2.0 era. However, as the information age has rapidly evolved—from AI passing the Turing test to AlphaGo defeating human champions—the era of artificial intelligence has arrived. The 20th Party Congress further emphasized achieving new informatization by 2035 and building China into a technological powerhouse, making AI development unstoppable. Yet technological advancement has also brought ethical concerns to the forefront of scholarly attention. As commercial AI applications deepen, AI has become a critical force driving social media development. However, due to algorithmic complexity, unpredictability, and difficulties in coordinating value rationality with instrumental rationality, AI ethical risks can negatively impact users' psychology and behavior, potentially diminishing human agency and reducing social participation—that is, fostering negativity and fatigue toward social behaviors (Wang & Han, 2020). Unfortunately, previous literature has overlooked the impact of AI ethical risk perception on social media fatigue. Therefore, our first research question examines whether AI ethical risk perception influences social media fatigue.

Our second research question addresses the underlying mechanism through which AI ethical risk perception affects social media fatigue. In research on social and prosocial behaviors, social connection represents a crucial variable (Lee et al., 2001; O' Rourke & Sidani, 2017), reflecting individuals' subjective psychological sense of belonging and intimacy with their surrounding world (Lee & Robbins, 1998). This study employs SSO theory to investigate the mediating role of social connection between AI ethical risk perception and social media fatigue. SSO theory posits that stressors induce strain responses in individuals, subsequently influencing behavioral reactions through the mediating role of internal psychological experiences (Koeske & Koeske, 1993). According to this framework, AI ethical risk perception as a stressor triggers social strain responses, such as changes in social connection, which in turn lead to social media fatigue behaviors. Thus, social connection may serve as a bridge linking

AI ethical risk perception and social media fatigue.

Furthermore, the relationship between stressors and individual behaviors is context-dependent (Koeske & Koeske, 1993), leading to our third research question concerning boundary conditions. When facing risks or experiencing negative emotions, nostalgia serves as a common coping strategy. Through nostalgic experiences, the authenticity of the past is reproduced, allowing individuals to regenerate within that past reality, making nostalgia a sanctuary for transferring from present-day values to past ones. Prior research conceptualizes nostalgia as a bittersweet longing for the past, dominated by positive emotions (Li et al., 2015; Wildschut et al., 2006), capable of maintaining self-esteem, alleviating existential threats, and enhancing social belonging (Juhl et al., 2010; Sedikides & Wildschut, 2019; Wildschut et al., 2006). Nostalgia is also considered a highly social emotion (Juhl et al., 2021). In this context, we propose that users' nostalgia tendency moderates the relationship between AI ethical risk perception and social media fatigue. Individuals with high nostalgia tendency can more easily buffer risks and restore self-positivity through nostalgia (Wildschut et al., 2006), better adapt to life (Sedikides et al., 2008), and find greater meaning in existence (Routledge et al., 2008), thereby reducing the negative impacts of AI ethical risk perception and inhibiting fatigue behaviors. We infer that when users possess high nostalgia tendency, they can effectively employ nostalgia strategies to counteract negative effects from AI ethical risk perception, reducing social media fatigue. Conversely, low nostalgia tendency users struggle to mitigate these negative impacts, making them more susceptible to social media fatigue. Therefore, this study investigates the moderating effect of nostalgia tendency on the relationship between AI ethical risk perception and social media fatigue.

In examining nostalgia' s moderating role, we further explore how different nostalgia types produce distinct effects. Davis (1979) distinguished between personal nostalgia and collective nostalgia—the former focuses on individual experiences with relatively fewer social connections, while the latter emphasizes social functions, strengthening individual-society bonds and enhancing social perception, making individuals more willing to communicate with others (Zhou et al., 2008) and spend considerable time on social activities (Stephan et al., 2015). We hypothesize that on social media platforms, when users experience personal nostalgia, its moderating effect on the relationship between AI ethical risk perception and social media fatigue will be limited due to its emphasis on the individual dimension. However, when users experience collective nostalgia, it increases their connection with society, effectively leveraging nostalgia' s regulatory function at the collective and social levels. Thus, different nostalgia types likely exert varying degrees of moderating influence. This study further examines the moderating effects of personal nostalgia and collective nostalgia on the relationship between AI ethical risk perception and social media fatigue.

In summary, this research investigates the impact of AI ethical risk perception on social media fatigue within the context of AI applications in social media,

examining both the mediating role of social connection and the moderating roles of nostalgia tendency and nostalgia type through empirical testing. This study enriches theoretical research on AI ethics and social media fatigue while providing guidance for marketing strategies and operational management of AI and social media platforms.

2. Research Theory and Hypotheses

2.1 AI Ethical Risk Perception and Social Media Fatigue

AI ethical risk perception refers to users' awareness of situations violating ethical principles when using AI, encompassing three dimensions: privacy, responsibility, and control (Wang et al., 2022). The privacy dimension involves users' perception of privacy infringement, such as AI potentially collecting and leaking personal data. The responsibility dimension concerns users' perception of risks in defining accountability, including AI' s inability to assume responsibility for accidents or determine fault attribution. The control dimension reflects users' perception of losing control over AI, such as concerns about AI autonomy, job displacement, and challenges to human agency. As ethics constitute a crucial societal issue (Sharkey, 2012), perceived ethical risks in AI inevitably impact individuals and society.

Social media fatigue has emerged as a major research focus in recent years, defined as a subjective, multidimensional user behavior pattern involving diminished needs and motivations for social network usage and interaction (Ravindran et al., 2014). Recent research characterizes it as frequent forgetting of usage purposes and hesitation when posting content (Zhang et al., 2021). Current conceptualizations remain inconsistent, primarily adopting two perspectives: (1) an emotional perspective defining it as exhaustion from technological, informational, and communicative overload (Dhir et al., 2018); and (2) a behavioral perspective defining it as negative usage behaviors such as reduced frequency, information neglect, lurking (Ravindran et al., 2014), intentional behavioral control, tolerated usage, or platform switching (Liu et al., 2017; Zhang et al., 2019), culminating in gradual reduction or abandonment of social media (Zhang et al., 2017). This study defines social media fatigue as behavior where users reduce usage frequency, diminish interaction willingness, or switch/exit platforms due to influences from personal, social, and information technology factors.

We argue that AI ethical risk perception promotes social media fatigue because all three dimensions exert positive effects. First, regarding privacy, extensive social media usage with high penetration, prolonged duration, and transparent interaction heightens online privacy concerns. Research demonstrates that privacy issues significantly correlate with social network fatigue (Dhir et al., 2019), and Bright et al. (2015) confirmed that privacy concerns during social site access generate psychological anxiety, increasing social media fatigue likelihood. Second, regarding responsibility, individuals must filter and screen information when judging accountability (Zhou et al., 2018). Stronger perception

of AI responsibility risk leads users to extensively filter exponentially growing information to avoid risks, causing information overload. Prior research proves information overload triggers negative psychological states (Zhang et al., 2016), with social media fatigue being a key consequence. This occurs because prolonged processing of massive social media information exceeds cognitive limits, leaving users overwhelmed and fatigued (Zhang et al., 2020). Studies also directly confirm information overload causes social media fatigue (Xiao & Mou, 2019). Third, regarding control, extensive organizational behavior literature indicates that control loss significantly impacts fatigue (McKnight & Glass, 1995; Michinov, 2005; Zhang et al., 2014). Li et al. (2019) directly found that reduced online control sense leads to social media fatigue. We therefore infer that when individuals perceive AI ethical risks causing control loss, social media fatigue may emerge. Based on this reasoning, we propose:

Hypothesis 1: AI ethical risk perception positively influences social media fatigue.

2.2 The Mediating Role of Social Connection

Lee and Robbins (1998) introduced social connection as a comprehensive concept defined as a self-attribute reflecting individuals' self-perception of maintaining intimate relationships with their surrounding world—a subjective psychological experience. This study conceptualizes social connection as the psychological sense of belonging and intimacy toward others or social groups, formed through individuals'summarization of experiences regarding close relationships (e.g., family, friends) and distant relationships (e.g., strangers, society) in their current environment.

Research indicates that negative perceptions such as risk perception affect individuals' social connection status (Bonner et al., 2011). According to Dunbar' s number, only 20% of normal social connections constitute strong ties, which face enormous impact in internet and AI environments (Zhang et al., 2019), not to mention the remaining 80% of weak ties that are even more vulnerable to negative perceptions. From AI ethical risk perception' s privacy and responsibility dimensions, if new technology introduction creates usage risks like privacy leakage or accountability issues during IT adoption, it easily triggers negative emotional responses such as worry or aversion (Lin et al., 2012). Without effective mitigation, this may reduce users' social belonging and intimacy (Yang & Zhang, 2016), weakening social connection. From the control dimension, reduced control sense from AI ethical risk perception stimulates the amygdala, causing individuals to experience fear, aversion, and anxiety that diminish social connection (Whalen, 1998; Seligman, 1975). Existing research on AI ethical risk perception indicates it inhibits public participation willingness (Song et al., 2020). We therefore infer that on social media platforms, AI ethical risk perception similarly reduces users' willingness to participate in society, affecting their social connection status. Based on this reasoning, we propose:

Hypothesis 2: AI ethical risk perception significantly negatively influences social connection.

Users' social media usage largely depends on their sense of belonging and intimacy toward others or groups, with social connection representing individuals' subjective perception of interpersonal relationship closeness in social life (Lee & Robbins, 1998). Research shows individuals with higher social connection tendencies perceive closer relationships with others and demonstrate greater willingness to participate in social group activities, whereas those with lower tendencies struggle to manage their needs and feelings, tending to avoid or withdraw from social opportunities that could strengthen their weak social connections (Lee et al., 2001). Behaviorally, high social connection effectively reduces negative behaviors arising from loneliness, anxiety, depression, low self-esteem, and other negative perceptions (Baumeister & Leary, 1995), while promoting social media usage behaviors that increase frequency and interaction willingness, thereby reducing social media fatigue. Based on this reasoning, we propose:

Hypothesis 3: Social connection significantly negatively influences social media fatigue.

The SSO theoretical framework, initially proposed by Koeske and colleagues in 1993 for psychology, examines how external environmental stress factors affect internal psychological processes. Its fundamental proposition states that stressors induce strain responses that influence behavioral outcomes through internal psychological experiences, rather than directly affecting behavioral results (Koeske & Koeske, 1993). The framework comprises three components: stressors (environmental factors causing stress and affecting psychological states), strain (subjective psychological experiences including perceptions, feelings, and thoughts induced by stressors), and outcomes (individual responses to stress, including psychological or behavioral reactions). According to SSO theory, after exposure to AI ethical risks, users experience negative emotions that reduce social connection, subsequently leading to social media fatigue behaviors. As discussed, all three dimensions of AI ethical risk—privacy, responsibility, and control—weaken social connection (Whalen, 1998; Lin et al., 2012), while higher social connection reduces social media fatigue (Lee et al., 2001; Baumeister & Leary, 1995). Scholars also propose that multidimensional negative emotions —fatigue, aversion, and weariness—arising from personal, platform, and social factors during social media usage reduce usage frequency and time, diminish interaction willingness, and cause platform switching or exit (Li & Li, 2017; Guo & Cao, 2018). Integrating SSO theory, we further infer that AI ethical risk perception' s promotion of social media fatigue occurs through the mediating role of social connection. Therefore, we propose:

Hypothesis 4: Social connection mediates the relationship between AI ethical risk perception and social media fatigue.

2.3 The Moderating Role of Nostalgia Tendency

Davis (1979) conceptualized nostalgia as a yearning for the past—a universal psychological experience throughout life that constitutes a positive emotional experience evoking pleasant feelings such as happiness, love, and warmth. Sedikides et al. (2004) similarly linked nostalgia to positive feelings as joyful recollections. During nostalgic reverie, individuals affectionately revisit meaningful events from childhood or interpersonal relationships, often longing to return to these cherished pasts (van Tilburg et al., 2019). Mainstream literature predominantly views nostalgia as a compound emotion dominated by positive affect (Wildschut et al., 2006), a perspective this study adopts.

Prior research indicates that individuals with high nostalgia tendency possess superior emotional regulation and cognitive construction functions (Hepper et al., 2021). For users with high nostalgia tendency, social media fatigue resulting from AI ethical risk perception will be attenuated for two reasons. First, nostalgia serves an emotional regulation function, with many researchers considering it a positive psychological state (Bryant et al., 2005; Holak & Havlena, 1998). Wildschut et al. (2006) view nostalgia as a reservoir of positive emotion, where nostalgic individuals hold highly positive perceptions of the past (Sedikides et al., 2008), generating positive emotional reactions including pleasure, warmth, security, and optimism (Routledge et al., 2008; Hilal et al., 2013). These positive emotions effectively mitigate the series of negative emotions from AI ethical risk perception' s privacy, responsibility, and control dimensions, reducing negative behaviors such as social media fatigue. Second, nostalgia possesses cognitive construction functions, serving as a positive experience that enhances life through improved positive self-evaluation, maintained self-continuity (Wildschut et al., 2006), strengthened social connection (Sedikides et al., 2015), increased sense of meaning and goal pursuit motivation (Stephan et al., 2015), and prosocial behavior (Li, 2015). These new cognitive constructions can change users' positive cognition toward themselves and society after AI ethical risk perception, thereby reducing negative behavioral outcomes and lowering social media fatigue. Based on this reasoning, we propose:

Hypothesis 5: Nostalgia tendency negatively moderates the relationship between AI ethical risk perception and social media fatigue. Specifically, higher nostalgia tendency weakens the positive effect of AI ethical risk perception on social media fatigue.

2.4 The Moderating Role of Nostalgia Type

Davis (1979) distinguished personal nostalgia from communal nostalgia. The former stems from individuals' actual early life experiences, reflecting stronger individual characteristics, while the latter arises from social, political, economic, and cultural symbols during major societal transformations, featuring distinct era characteristics and strong group traits. Similarly, Brown et al. (2003) proposed collective nostalgia—a yearning for past cultures and eras shared by peo-

ple with similar backgrounds in specific times, such as the collective nostalgia of those born in the 1980s and 1990s for the Beijing Olympics. This study accordingly categorizes nostalgia into personal nostalgia and collective nostalgia.

Collective nostalgia emphasizes social functions, strengthening individual-society bonds and enhancing social perception. During nostalgic experiences, individuals' sense of closeness with others in their collective increases substantially, making them more willing to communicate and share with neighbors (Zhou et al., 2008) and spend considerable time on social activities (Stephan et al., 2015). Collective nostalgia also helps people adapt to life, cope with social environmental changes and accident threats, and maintain self-unity. Through collective nostalgia, individuals immerse themselves in past social cultures or eras they consider meaningful for family and social groups, enhancing cultural values to solve problems while developing honor and mission, maintaining deep love for social collectives, developing continuous selves, and better adapting to life—thereby inhibiting social media fatigue behaviors.

Personal nostalgia, functionally, can store positive emotions (Sedikides et al., 2008) and enhance self-positivity, but it emphasizes the self with strong individual characteristics. Its association with social behaviors like social media fatigue on social platforms is relatively weak, suggesting personal nostalgia has weaker moderating effects compared to collective nostalgia on AI ethical risk perception-induced social media fatigue. We therefore infer that in the relationship between AI ethical risk perception and social media fatigue, collective nostalgia exhibits stronger negative moderating effects than personal nostalgia. Based on this reasoning, we propose:

Hypothesis 6: Collective nostalgia tendency negatively moderates the relationship between AI ethical risk perception and social media fatigue. Specifically, higher collective nostalgia tendency weakens the positive effect of AI ethical risk perception on social media fatigue.

Hypothesis 7: Personal nostalgia tendency has no moderating effect on the relationship between AI ethical risk perception and social media fatigue.

The research model is illustrated in Figure 1.

Figure 1 [Figure 1: see original paper] Research Model

We will conduct three studies to test these hypotheses, all using questionnaire surveys. Study 1 examines the effect of AI ethical risk perception on social media fatigue. Study 2 tests the mediating effect of social connection and the moderating effect of nostalgia tendency. Study 3 examines differences in moderating effects across nostalgia types.

3. Study 1

3.1 Research Sample and Method

We distributed online survey links through Wenjuanxing, ultimately collecting 449 valid questionnaires. Sample descriptive statistics are shown in Table 1 . Among respondents, 46.5% were male and 53.5% female; 59.1% were aged 19-35. Educational attainment included: junior high school or below (7.6%), high school or technical secondary school (16.3%), college or undergraduate (68.0%), and graduate school or above (8.2%). Frequency of AI product purchase and usage was relatively evenly distributed, with more high-frequency than low-frequency users.

Table 1 Descriptive Statistics of the Sample

The survey comprised three parts. First, we measured AI ethical risk perception using the scale developed by Wang et al. (2022), which includes 12 items across three dimensions: privacy risk, responsibility risk, and control risk ($\alpha = 0.82$). Second, social media fatigue was measured using Bright et al.' s (2015) 8-item scale ($\alpha = 0.72$). Finally, respondents reported their social overload level, which prior research has identified as an important antecedent of social media fatigue (Dhir & Midha, 2014; Zhang et al., 2016). We treated this as a control variable using Maier et al.' s (2015) social overload scale ($\alpha = 0.79$).

Table 2 Scale Items

3.2.1 Correlation Analysis

Table 3 summarizes means, variances, and correlation coefficients. AI ethical risk perception significantly and positively correlates with social media fatigue ($r = 0.36$, $p < 0.01$).

Table 3 Correlation Coefficients, Means, and Standard Deviations of Variables

3.2.2 Regression Analysis

Regression results appear in Table 4 . Model M1 shows the relationship between the control variable (social overload) and dependent variable (social media fatigue). Model M2 includes both control and independent variables (AI ethical risk perception). Results indicate that AI ethical risk perception significantly predicts social media fatigue ($\beta = 0.35$, $t = 8.24$, $p < 0.001$), and this effect remains significant after controlling for social overload ($\beta = 0.30$, $t = 6.70$, $p < 0.001$).

Table 4 Regression Analysis of AI Ethical Risk Perception and Social Media Fatigue

3.3 Discussion

Study 1 demonstrates that AI ethical risk perception positively promotes social media fatigue. However, it does not verify causality or consider mediating and moderating variables. Therefore, Study 2 will test causal relationships by introducing social connection and nostalgia tendency to further explore how and under what conditions AI ethical risk perception triggers social media fatigue.

4. Study 2

4.1 Research Method

We used the same scales for AI ethical risk perception ($\alpha = 0.82$) and social media fatigue ($\alpha = 0.72$) as in Study 1. Social connection was measured using Lee et al.' s (2001) 20-item scale ($\alpha = 0.80$). Nostalgia tendency was assessed using Holbrook' s (1993) scale (see Table 5 ; $\alpha = 0.86$). Social overload served as the control variable (Maier et al., 2015; $\alpha = 0.79$).

Table 5 Scale Items

4.2.1 Correlation Analysis

Table 6 presents means, variances, and correlations. AI ethical risk perception significantly correlates with social connection (r = -0.27, p < 0.01) and social media fatigue (r = 0.36, p < 0.01). Social connection also significantly and negatively correlates with social media fatigue (r = -0.27, p < 0.01), providing preliminary support for our hypotheses.

Table 6 Correlation Coefficients, Means, and Standard Deviations of Variables

4.2.2 Main Effect and Mediation Test

We employed the bootstrap method using Hayes' (2017) SPSS macro PROCESS Model 4 (simple mediation) to test the mediation model while controlling for social overload. Results appear in Tables 7 and 8. Table 7 shows Model M1 (AI ethical risk perception predicting social connection), Model M2 (AI ethical risk perception predicting social media fatigue), and Model M3 (AI ethical risk perception and social connection jointly predicting social media fatigue, with controls). AI ethical risk perception significantly predicts social media fatigue (M2: $\beta = 0.30$, t = 6.70, p < 0.001), and this direct effect remains significant but weaker when the mediator is included (M3: $\beta = 0.28$, t = 6.12, p < 0.001). AI ethical risk perception significantly negatively predicts social connection (M1: β = -0.17, t = -3.73, p < 0.001), and social connection significantly negatively predicts social media fatigue (M3: β = -0.15, t = -3.16, p < 0.01). Furthermore, the bootstrap 95% confidence intervals for both the direct effect of AI ethical risk perception on social media fatigue and the indirect effect through social connection exclude zero (see Table 8), indicating that AI ethical risk perception predicts social media fatigue both directly and indirectly through social

connection. The direct effect (0.27) and indirect effect (0.10) account for 90.0% and 10.0% of the total effect (0.30), respectively.

Table 7 Mediation Model Test for Social Connection

Table 8 Decomposition of Total, Direct, and Indirect Effects

4.2.3 Nostalgia Tendency Moderation Test

We used PROCESS Model 5 (which assumes the direct path is moderated, consistent with our theoretical model) to test the moderating effect while controlling for social overload. Results appear in Tables 9 and 10. Table 9 shows that after including nostalgia tendency, the interaction term between AI ethical risk perception and nostalgia tendency significantly negatively predicts social media fatigue (β = -0.11, t = -3.56, p < 0.001), indicating a negative moderating effect. Table 10 further shows that the direct effect is significant for the low nostalgia tendency group (β = 0.36, t = 6.77, p < 0.001) but weaker for the high nostalgia tendency group (β = 0.13, t = 2.29, p < 0.05), confirming the negative moderation.

Table 9 Moderation Model Test for Nostalgia

Table 10 Direct Effects at Different Levels of Nostalgia Tendency

Simple slope analysis using PROCESS-generated code (Figure 1) reveals that for low nostalgia tendency participants (M - 1SD), AI ethical risk perception significantly positively affects social media fatigue (β = 0.36, t = 6.77, p < 0.001). For high nostalgia tendency participants (M + 1SD), this positive effect weakens (β = 0.13, t = 2.29, p < 0.05), demonstrating that high nostalgia tendency reduces the positive predictive effect of AI ethical risk perception on social media fatigue.

Figure 1 [Figure 1: see original paper] Moderating Effect of Nostalgia Tendency on the Relationship Between AI Ethical Risk Perception and Social Media Fatigue

4.2.4 Nostalgia Type Moderation Test

We measured both collective and personal nostalgia tendencies, then classified respondents into collective nostalgia (n = 76) and personal nostalgia (n = 90) groups based on their scores. Using PROCESS Model 5 while controlling for social overload, we examined moderating effects across groups. Results appear in Tables 11 and 12 . In the collective nostalgia group, the interaction term between AI ethical risk perception and nostalgia tendency significantly negatively predicts social media fatigue (β = -0.24, t = -3.39, p < 0.001), indicating significant negative moderation. The direct effect is significant for low nostalgia tendency (β = 0.66, t = 4.98, p < 0.001) but nonsignificant for high nostalgia tendency (β = 0.17, t = 1.36, p > 0.05). In the personal nostalgia group, the

interaction term is nonsignificant ($\beta = 0.06$, t = -0.62, $p > 0.05$), indicating no moderating effect.

Table 11 Moderation Model Test for Nostalgia Type

Table 12 Direct Effects of Nostalgia Tendency Across Nostalgia Types

Simple slope analysis (Figure 2) shows that in the collective nostalgia group, AI ethical risk perception significantly affects social media fatigue, with significant differences between high ($\beta = 0.17$, t = 1.36, $p > 0.05$) and low nostalgia tendency ($\beta = 0.66$, t = 4.98, $p < 0.001$). In the personal nostalgia group, no significant difference exists between high ($\beta = 0.55$, t = 3.43, $p < 0.001$) and low nostalgia tendency ($\beta = 0.43$, t = 2.27, $p < 0.05$). This indicates that nostalgia tendency significantly moderates the relationship only in the collective nostalgia group, where high collective nostalgia tendency reduces the positive effect of AI ethical risk perception on social media fatigue, while personal nostalgia tendency shows no significant moderation.

Figure 2 [Figure 2: see original paper] Moderating Effect of Nostalgia Type on the Relationship Between AI Ethical Risk Perception and Social Media Fatigue

5. General Discussion

5.1 Theoretical Implications

This study' s theoretical contributions manifest in three ways. First, it expands social media fatigue research from an AI perspective. Existing studies primarily explain social media fatigue from traditional internet perspectives (Ravindran et al., 2014; Dhir et al., 2019). This research 切入 from the emerging technology perspective of AI, focusing on how AI ethical risk perception influences social media fatigue. In the AI ethics domain, Kohli and Geis (2018) identified safety, algorithmic discrimination, and artificial subject rights as key ethical risks, arising from algorithmic complexity, unpredictability, value conflicts, and limited risk cognition (Tan & Yang, 2019; Ding et al., 2013). While scholars have analyzed AI ethical risks at macro and micro levels (Yan & Ma, 2018; Wang, 2014; Duan, 2017; Jia, 2019; Wu, 2018; Lan, 2018), they have not explored how AI ethical risk perception affects social media fatigue. This study bridges this gap through rigorous empirical analysis, demonstrating the positive effect of AI ethical risk perception on social media fatigue. The findings clarify AI ethical risk perception' s influence mechanisms, fill a research void, extend AI ethics from ethics to marketing, and broaden the concept' s applicability.

Second, based on SSO theory, this study proposes social connection as a mediator between AI ethical risk perception and social media fatigue, revealing the psychological mechanism through which AI ethical risk perception' s three dimensions reduce social connection and increase fatigue. No prior research has examined how AI ethical risk perception influences user behavior. This study uncovers a new psychological mediation pathway—showing that stressors reduce social connection, thereby decreasing social behaviors—thereby extending SSO

theory' s research scope beyond traditional mediators like social media overload (Li et al., 2022), fear of missing out (Ma et al., 2022), and negative emotions (Yuan, 2021).

Third, this study identifies boundary conditions by examining nostalgia tendency' s negative moderation. Specifically, when using social media, the relationship between AI ethical risk perception and social media fatigue is negatively moderated by nostalgia tendency—high nostalgia tendency effectively inhibits AI ethical risk perception' s negative outcomes. This finding applies nostalgia to social media contexts, confirming that high nostalgia tendency suppresses negative perceptions (Juhl et al., 2021; Van Tilburg et al., 2019). Further distinguishing collective from personal nostalgia, we find collective nostalgia exhibits stronger negative moderation because it is relationship-oriented and emphasizes social, cultural, generational, and group levels (Baker & Kennedy, 1994), strengthening individual-group connection willingness and mitigating AI ethical risk perception' s negative social connection effects. This responds to calls for more nostalgia research in emerging technology contexts (Zhang & Sun, 2011). Overall, this study enriches understanding of AI ethics and social media fatigue by delineating boundary conditions.

5.2 Practical Implications

AI ethical risk has become an unavoidable issue in the new era (Yampolskiy & Spellchecker, 2016). The 20th Party Congress emphasized improving social governance systems and building a social governance community, while the first plenary session of the 20th Central Committee proposed improving technology evaluation systems and ethical governance mechanisms. As social media shows signs of decline after a decade of prosperity, preventing AI ethics' negative impacts and reducing social media fatigue are critical challenges for internet marketers. The practical implications are as follows.

For government: Results show AI ethical risk perception significantly and positively affects social media fatigue. As AI popularization and its negative effects are inevitable, governments must effectively guide public understanding of emerging technology ethical risks, lead forward-looking thinking, and maintain effective dynamic evolution between society and technology. For example, governments could establish a "digital human rights" certification model, setting digital rights for internet, instant messaging, online education, mobile payments, cloud computing, and intelligent robots while upholding socialist core values. Technology applications must not deviate from human nature or dignity. Additionally, governments must strengthen institutional trust, improve credibility, and manage risks across social systems through legal development, corporate innovation responsibility, media supervision, public interest protection, and effective ethical risk resolution channels. This includes issuing management regulations for AI algorithms, strengthening assessment and review of algorithm-related data and models, refining user right-to-know provisions, clarifying AI service provider norms, and establishing accountability mechanisms

for full-process government supervision. Finally, governments should initiate AI-specific legislation with foresight, focusing on autonomous driving, smart cities, intelligent healthcare, AI education, and smart childcare to gradually establish a comprehensive legal system for future AI applications.

For social media platforms: First, as AI technology represents the new era' s frontier, social media platforms inevitably integrate AI. Companies must establish corporate responsibility, address ethical issues alongside profits, and shoulder social responsibility. Second, marketers need strategies to inhibit AI ethics-induced social media fatigue. Our findings show nostalgia tendency significantly moderates this relationship, with strong collective nostalgia effectively inhibiting negative outcomes. Therefore, platform marketers can design collective nostalgia-evoking advertisements and campaigns when applying AI. For example, prompting users to provide keywords about the collective fight against COVID-19 in 2020 for AI-generated artwork can trigger collective nostalgia, effectively mitigating AI ethical risk' s negative impacts. Additionally, platforms can respond to national poverty alleviation policies by using AI big data to synthesize past and present photos, even predicting future scenes, allowing collective reflection on national development and economic growth—shared collective memories that alleviate AI ethics-induced fatigue.

5.3 Limitations and Future Directions

This study has several limitations requiring future investigation. First, it examined AI ethical risk perception' s impact on social media fatigue in social media contexts; future research should explore effects on other social behaviors. Second, this study identified nostalgia tendency as a boundary condition, but other potential moderators exist, such as illusion of control (Lee & Chung, 2008), warranting future examination. Third, this research was conducted on Chinese social media platforms. As foreign platforms are more mature with faster AI development, future research should investigate whether cultural differences between Chinese and foreign users affect the relationship between AI ethical risk perception and social media fatigue.

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