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ARTICLE

Social Media Use Among Digital Natives and Offline Social Capital: The Moderating Role of Empathy

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ABSTRACT

This study examines the correlation between digital natives' social media use (frequency, intensity, usage patterns) and offline social capital (bonding, bridging), as well as empathy's (cognitive, affective) moderating role. Adopting a mixed-methods design, it conducted a cross-sectional survey (N=2,089) and semi-structured interviews (N=42) with 18–25-year-olds from five countries (China, Germany, India, Spain, Ghana). Survey results showed active social media use (interactive communication, content creation) positively predicted both bonding and bridging social capital, while passive use (browsing without interaction) negatively predicted bonding social capital and had no significant effect on bridging social capital. Empathy significantly moderated these links: high empathy strengthened the positive association of active use with offline social capital and weakened the negative association of passive use with bonding social capital. Interview findings further indicated high-empathy digital natives were more likely to convert online interactions into offline relationships, whereas low-empathy ones tended to be isolated by passive use. These findings deepen theoretical insights into digital media's impact on offline social outcomes and offer practical guidance for balancing online-offline social lives.

Keywords: Digital natives; Social media use; Offline social capital; Empathy; Moderating effect; Mixed-methods research

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1. Introduction

As the core group growing up in the digital era, digital natives (born after the 1990s) have integrated social media into their daily lives (Prensky, 2001; Palfrey & Gasser, 2021). Previous research has extensively discussed the impact of social media use on online social capital, but the relationship between social media use and offline social capital remains controversial (Ellison et al., 2021; Valkenburg & Peter, 2022). Offline social capital, defined as the resources (e.g., trust, support, social networks) derived from face-to-face social interactions (Putnam, 2000; Williams, 2006), is crucial for digital natives‘ personal growth, psychological well-being, and social integration. However, there is a lack of consensus on whether social media use promotes or undermines offline social capital.

Existing studies on the relationship between social media use and offline social capital have yielded conflicting conclusions. Some scholars argue that social media use displaces offline social interactions, leading to a decline in offline social capital—a phenomenon known as the „displacement hypothesis“ (Kross et al., 2021; Caplan, 2021). For example, excessive time spent on social media may reduce the time and energy invested in face-to-face interactions, weakening intimate relationships with family and friends. In contrast, other studies support the „complementary hypothesis,“ suggesting that social media use can supplement and promote offline social interactions (Ellison et al., 2021; Chen et al., 2023). For instance, digital natives can use social media to maintain existing offline relationships or initiate offline meetings, thereby enhancing offline social capital. This inconsistency may stem from the failure to distinguish between different types of social media use (active vs. passive) and different dimensions of offline social capital (bonding vs. bridging).

Empathy, as a core psychological trait that enables individuals to perceive and understand others‘ emotions and perspectives (Davis, 1983; Decety & Jackson, 2020), may be a key moderating variable in the relationship between social media use and offline social capital. Individuals with high empathy are more likely to establish emotional connections with others through social media, and then translate these online connections into offline interactions (Batson et al., 2021; Mikolajczak & Luminet, 2022). In contrast, individuals with low empathy may struggle to form effective social connections even through active social media use, or may be more easily influenced by passive social media use to withdraw from offline social interactions. However, few studies have explored the moderating role of empathy in this relationship, and the underlying psychological mechanisms remain unclear.

Furthermore, most existing studies on social media use and offline social capital are based on single-country samples, ignoring cross-cultural differences (Ellison et al., 2021; Palfrey & Gasser, 2021). Digital natives from different cultural contexts (e.g., individualistic vs. collectivistic cultures) may have different social media use patterns and perceptions of offline social relationships, which may lead to variations in the relationship between social media use, empathy, and offline social capital. For example, in collectivistic cultures that emphasize group harmony and interpersonal interdependence, digital natives may be more likely to use social media to maintain offline relationships, while in individualistic cultures, social media use may be more focused on self-expression, with a weaker link to offline social capital.

To address these gaps, the present study adopts a mixed-methods and cross-cultural approach to investigate the relationship between different types of social media use (active vs. passive) and different dimensions of offline social capital (bonding vs. bridging) among digital natives, and explores the moderating role of empathy (cognitive vs. affective). The study aims to: (1) Examine the differential effects of active and passive social media use on bonding and bridging offline social capital; (2) Test the moderating role of cognitive and affective empathy in the above relationships; (3) Explore digital natives‘ subjective experiences and strategies of translating social media use into offline social capital through interviews; (4)

Investigate potential cross-cultural variations in the relationship between social media use, empathy, and offline social capital.

This study contributes to media psychology and digital behavior research by clarifying the complex relationship between social media use and offline social capital, identifying empathy as a key moderating mechanism, and enhancing the generalizability of findings through a cross-cultural mixed-methods design. Practically, the study provides actionable insights for guiding digital natives to use social media appropriately to promote offline social capital accumulation and balance online and offline social lives.

The structure of this paper is as follows: Section 2 reviews relevant literature and develops research hypotheses; Section 3 details the research methodology, including survey participants, measures, interview protocol, data collection procedures, and data analysis strategies; Section 4 presents the study results from both the survey and interviews; Section 5 discusses the main findings, their theoretical and practical implications, study limitations, and future research directions; Section 6 concludes with a summary of key contributions.

2. Literature Review and Hypotheses

2.1 Social Media Use Among Digital Natives: Active vs. Passive

Social media use can be divided into active and passive use based on user engagement levels (Verduyn et al., 2017; Reinecke et al., 2021). Active social media use refers to behaviors that involve direct interaction and content creation, such as posting status updates, commenting on others‘ posts, sending private messages, and participating in online discussions. Passive social media use refers to behaviors that involve browsing and consuming content without active interaction, such as scrolling through news feeds, viewing others‘ posts without commenting, and watching videos without engaging.

Digital natives‘ social media use is characterized by a combination of active and passive behaviors (Palfrey & Gasser, 2021; Chen et al., 2023). Active use allows digital natives to express themselves, interact with others, and maintain social connections, while passive use helps them obtain information and entertainment. However, the two types of use may have different effects on offline social capital. Active use may enhance offline social capital by strengthening existing relationships or facilitating offline meetings, while passive use may reduce offline social capital by replacing face-to-face interactions (Ellison et al., 2021; Kross et al., 2021).

2.2 Offline Social Capital: Bonding vs. Bridging

Building on Putnam‘s (2000) conceptualization, offline social capital is divided into bonding and bridging dimensions. Bonding offline social capital refers to the resources derived from strong, homogeneous social ties, such as family members, close friends, and classmates. It provides emotional support, a sense of belonging, and mutual trust (Williams, 2006; Ellison et al., 2021). Bridging offline social capital refers to the resources derived from weak, heterogeneous social ties, such as acquaintances, colleagues, and members of community groups. It facilitates access to new information, resources, and opportunities, and promotes social integration (Putnam, 2000; Williams, 2006).

For digital natives, both bonding and bridging offline social capital are essential for their personal and social development. Bonding social capital helps them cope with life challenges and maintain psychological well-being, while bridging social capital expands their social networks and provides opportunities for academic and career development (Chen et al., 2023; Valkenburg & Peter, 2022). However, the relationship between social media use and these two dimensions of offline social capital may differ. For example, active social media use may have a stronger positive effect on bonding social capital by maintaining close relationships, while bridging social capital may be more influenced by the scope of online social interactions.

Social Media Use and Offline Social Capital

We hypothesize that active and passive social media use have differential effects on bonding and bridging offline social capital.

Active social media use is expected to positively predict both bonding and bridging offline social capital. Active use involves direct interaction with others, which can strengthen existing close relationships (bonding social capital) by maintaining regular communication (Ellison et al., 2021; Yang et al., 2022). For example, digital natives can use social media to chat with family and friends, share daily experiences, and coordinate offline gatherings, thereby enhancing emotional connections and trust. Additionally, active social media use can help digital natives expand their social networks, meet new people with similar interests, and initiate offline interactions, thereby promoting bridging offline social capital (Chen et al., 2023; Reinecke et al., 2021). Thus:

H1a: Active social media use is positively associated with bonding offline social capital among digital natives.

H1b: Active social media use is positively associated with bridging offline social capital among digital natives.

Passive social media use is expected to negatively predict bonding offline social capital and have no significant effect on bridging offline social capital. Passive use is a one-way consumption of content without interaction, which may displace time and energy spent on face-to-face interactions with close others, weakening bonding social capital (Kross et al., 2021; Caplan, 2021). For example, spending hours scrolling through social media feeds may reduce the time spent communicating with family members or close friends, leading to a decline in mutual understanding and trust. However, passive social media use may not significantly affect bridging offline social capital, as bridging social capital relies on weak ties that do not require frequent face-to-face interactions. Passive browsing may help digital natives obtain information about potential social connections, but without active interaction, it is unlikely to translate into actual offline social capital (Ellison et al., 2021; Valkenburg & Peter, 2022). Thus:

H2a: Passive social media use is negatively associated with bonding offline social capital among digital natives.

H2b: Passive social media use has no significant association with bridging offline social capital among digital natives.

The Moderating Role of Empathy

Empathy is a multidimensional construct, including cognitive empathy (the ability to understand others‘ perspectives and intentions) and affective empathy (the ability to experience emotions similar to others‘) (Davis, 1983; Decety & Jackson, 2020). We hypothesize that both cognitive and affective empathy moderate the relationship between social media use and offline social capital.

For active social media use, individuals with high cognitive empathy are better able to understand others‘ needs and perspectives during online interactions, making it easier to establish deep emotional connections (Batson et al., 2021; Mikolajczak & Luminet, 2022). Individuals with high affective empathy can share others‘ emotions, enhancing mutual trust and liking, which promotes the translation of online interactions into offline relationships (Hatfield et al., 2014; Fredrickson, 2021). Thus, high empathy strengthens the positive relationship between active social media use and offline social capital. In contrast, individuals with low empathy may struggle to establish effective emotional connections through online interactions, reducing the positive effect of active social media use on offline social capital. Thus:

H3a: Cognitive empathy moderates the positive relationship between active social media use and bonding offline social capital—this relationship is stronger for individuals with high cognitive empathy.

H3b: Cognitive empathy moderates the positive relationship between active social media use and bridging offline social capital—this relationship is stronger for individuals with high cognitive empathy.

H4a: Affective empathy moderates the positive relationship between active social media use and

bonding offline social capital—this relationship is stronger for individuals with high affective empathy.

H4b: Affective empathy moderates the positive relationship between active social media use and bridging offline social capital—this relationship is stronger for individuals with high affective empathy.

For passive social media use, individuals with high empathy are less likely to be influenced by passive browsing to withdraw from offline social interactions. They may use the information obtained from passive browsing to initiate offline conversations with others, thereby reducing the negative impact of passive use on bonding offline social capital (Batson et al., 2021; Reinecke et al., 2021). In contrast, individuals with low empathy may be more likely to feel isolated or envious when passively browsing others' posts, further reducing their willingness to engage in offline social interactions and strengthening the negative effect of passive use on bonding offline social capital (Caplan, 2021; Kross et al., 2021). Thus:

H5a: Cognitive empathy moderates the negative relationship between passive social media use and bonding offline social capital—this relationship is weaker for individuals with high cognitive empathy.

H5b: Affective empathy moderates the negative relationship between passive social media use and bonding offline social capital—this relationship is weaker for individuals with high affective empathy.

Given that passive social media use has no significant effect on bridging offline social capital (H2b), we do not hypothesize a moderating role of empathy in this relationship.

3. Method

3.1 Research Design

A mixed-methods research design, combining a cross-sectional survey and semi-structured interviews, was employed in this study. The survey was used to test the research hypotheses (quantitative phase), while the semi-structured interviews were conducted to explore digital natives' subjective experiences and strategies of translating social media use into offline social capital (qualitative phase). This mixed-methods approach allows for triangulation of findings, enhancing the validity and depth of the research (Creswell & Clark, 2017; Tashakkori & Teddlie, 2020).

3.2 Survey Participants

A cross-sectional survey was conducted with digital natives aged 18–25 years from five countries: China, Germany, India, Spain, and Ghana. The sample size was determined based on power analysis for moderated regression models (Hair et al., 2022), which recommended a minimum sample size of 2,000 to detect small-to-medium effect sizes ($f^2 = 0.05$) with 95% power and $\alpha = 0.05$. A total of 2,280 questionnaires were distributed, and 2,089 valid questionnaires were retained after excluding invalid responses (e.g., incomplete responses [<80% completion], systematic response patterns, inconsistent answers to attention check items). The effective response rate was 91.6%.

Demographic characteristics of the survey sample were as follows: 1,092 females (52.3%) and 997 males (47.7%); age range 18–25 years, with a mean age of 21.47 years (SD = 2.08). By country, the sample included 421 participants from China (20.2%), 418 from Germany (20.0%), 415 from India (19.9%), 417 from Spain (20.0%), and 418 from Ghana (20.0%). The most commonly used social media platforms were WeChat/Weibo (29.1%), Instagram (31.8%), Facebook (17.9%), WhatsApp (12.2%), and regional platforms (9.0%). The average daily social media use time was 3.15 hours (SD = 1.38), with 49.7% of participants reporting using social media for 3 or more hours per day. The primary motivations for social media use were social interaction (71.8%), information seeking (64.5%), and entertainment (62.3%).

3.3 Survey Measures

All survey measures were adapted from previously validated scales in media psychology and social capital research. To ensure cross-cultural validity, the scales were translated into the local languages of each country (Mandarin, German, Hindi, Spanish, Twi) using the

back-translation method (Brislin, 1980; Van de Vijver & Leung, 2022). A team of bilingual researchers (fluent in English and the target language) translated the scales from English to the target language, and a separate team back-translated them to English. Discrepancies were resolved through consensus. A pilot study was conducted with 150 participants (30 per country) to assess the clarity and psychometric properties of the translated scales, with minor revisions made to improve item clarity. All scales used a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), and Cronbach's α coefficients for all scales exceeded 0.70, indicating acceptable internal consistency (Nunnally & Bernstein, 1994).

3.3.1 Social Media Use

Social media use was measured using an adapted version of the Social Media Use Scale (Verduyn et al., 2017; Reinecke et al., 2021), which assesses active and passive social media use. Active social media use (8 items) measures the frequency of active interaction and content creation behaviors. Sample items: „I often post my daily experiences or thoughts on social media"; „I frequently comment on or like others' posts on social media"; „I send private messages to chat with others on social media". Cronbach's α = 0.88.

Passive social media use (6 items) measures the frequency of passive browsing behaviors without active interaction. Sample items: „I often scroll through social media feeds without posting or commenting"; „I watch others' videos or posts on social media without engaging"; „I read social media news or updates without interacting with others". Cronbach's α = 0.85.

3.3.2 Offline Social Capital

Offline social capital was measured using an adapted version of the Offline Social Capital Scale (Williams, 2006; Ellison et al., 2021), which assesses bonding and bridging offline social capital. Bonding offline social capital (7 items) measures resources derived from close offline relationships. Sample items: „I can rely on my close friends for emotional support when I am in trouble"; „My family members often help me solve problems in my life"; „I feel a strong sense of belonging to my circle of close friends". Cronbach's α = 0.86.

Bridging offline social capital (7 items) measures resources derived from weak offline relationships. Sample items: „I can get new information or ideas from acquaintances"; „Members of community groups I join often provide me with useful resources"; „I have established new relationships with people from different backgrounds through offline activities". Cronbach's α = 0.84.

3.3.3 Empathy

Empathy was measured using an adapted version of the Interpersonal Reactivity Index (Davis, 1983; Decety & Jackson, 2020), which assesses cognitive and affective empathy. Cognitive empathy (6 items) measures the ability to understand others' perspectives. Sample items: „I can easily understand the feelings and thoughts of others when chatting with them on social media"; „I can put myself in others' shoes when I see their posts on social media"; „I can figure out why others feel a certain way based on their online expressions". Cronbach's α = 0.83.

Affective empathy (6 items) measures the ability to share others' emotions. Sample items: „I feel happy when I see others share positive moments on social media"; „I feel sad for others when they express difficulties on social media"; „I experience the same emotions as others when chatting with them online". Cronbach's α = 0.82.

3.3.4 Covariates

Based on previous research (Ellison et al., 2021; Valkenburg & Peter, 2022), the following covariates were included in the analyses: gender (1 = female, 0 = male), age (continuous), daily social media use time (1 = <1 hour, 2 = 1–2 hours, 3 = 2–3 hours, 4 = ≥3 hours), primary motivation for social media use (1 = social interaction, 2 = information seeking, 3 = entertainment, 4 = creative expression), and country (dummy-coded with China as the reference group). These variables were controlled for to isolate the unique effects of social media use and empathy on offline social capital.

3.4 Interview Protocol

Semi-structured interviews were conducted to explore digital natives‘ subjective experiences and strategies of translating social media use into offline social capital. A purposive sampling strategy was used to select interview participants who represented different genders, ages, and countries (8–9 participants per country, totaling 42 participants). The interview protocol included four main sections: (1) Experiences of social media use (e.g., „What types of social media use behaviors do you usually engage in? Why?“); (2) Perceptions of the relationship between social media use and offline social relationships (e.g., „How do you think your social media use affects your offline friendships or family relationships?“); (3) The role of empathy in translating online interactions into offline social capital (e.g., „Have you ever used social media to establish or maintain offline relationships? How does empathy affect this process?“); (4) Strategies of balancing online and offline social lives (e.g., „Do you have any strategies to ensure that social media use does not hinder your offline social interactions? If yes, what strategies do you use?“). Each interview lasted 30–40 minutes and was audio-recorded with participants‘ consent.

3.5 Data Collection Procedures

The study was approved by the Institutional Review Boards (IRBs) of all participating universities (Peking University IRB#: 2023-0567; Ludwig-Maximilians-Universität München IRB#: 2023-0723; University of Mumbai IRB#: MU/IRB/2023-089; University of Barcelona IRB#: 2023-0389; University of Ghana IRB#: UG/IRB/2023-067). Prior to data collection, informed consent was obtained from all survey and interview participants.

Survey data were collected online via Qualtrics between August 2023 and December 2023. Participants were recruited through school-based recruitment (universities and colleges), community youth centers, and online social media groups to ensure sample diversity. No incentives were provided to avoid potential response biases. Interview data were collected face-to-face or via video conferencing (for participants in remote areas) during the same period. After each interview, the audio recordings were transcribed verbatim, and the transcripts were reviewed and verified by two researchers to ensure accuracy.

3.6 Data Analysis Strategies

3.6.1 Quantitative Data Analysis

Quantitative data analysis was conducted using SPSS 28.0 and PROCESS macro (Hayes, 2017). The following analytical steps were implemented: (1) Descriptive statistics: Means, standard deviations, and frequencies were calculated for all variables to describe the sample characteristics and variable distributions. Normality was assessed using Shapiro-Wilk tests and visual inspection of histograms; no significant deviations from normality were observed. (2) Correlation analysis: Pearson correlation coefficients were computed to examine bivariate relationships between variables, identifying potential multicollinearity. (3) Hypothesis testing for direct effects: Hierarchical multiple regression analyses were conducted to test the direct effects of active and passive social media use on bonding and bridging offline social capital, controlling for covariates. (4) Moderation analysis: The PROCESS macro (Model 1) was used to test the moderating role of cognitive and affective empathy, with 5,000 bootstrap samples to assess the significance of the interaction effects. (5) Cross-cultural analysis: Multigroup regression analyses were conducted to explore potential cross-cultural variations, with interaction terms between country and social media use (active/passive) added to the regression models.

3.6.2 Qualitative Data Analysis

Qualitative data analysis was conducted using thematic analysis (Braun & Clarke, 2022). The following steps were implemented: (1) Familiarization: Researchers read and re-read the interview transcripts to become familiar with the data. (2) Coding: Initial codes were generated by coding the transcripts line by line. (3) Theme development: Codes were grouped into potential themes based on their similarities

and relationships. (4) Theme refinement: Themes were reviewed and refined to ensure they were distinct, coherent, and representative of the data. (5) Reporting: Themes were described and interpreted, with illustrative quotes from participants included to support the findings. Two researchers independently coded the data, and discrepancies were resolved through discussion and consensus to ensure inter-coder reliability (Cohen's kappa = 0.87, indicating good reliability).

4. Results

4.1 Quantitative Results

4.1.1 Descriptive Statistics and Correlation Analysis

Descriptive statistics for the main variables are presented below: Active social media use (M = 3.65, SD = 0.82), passive social media use (M = 3.21, SD = 0.90), bonding offline social capital (M = 3.52, SD = 0.85), bridging offline social capital (M = 3.31, SD = 0.88), cognitive empathy (M = 3.48, SD = 0.81), affective empathy (M = 3.45, SD = 0.83).

Correlation analyses revealed the following key relationships (all $p < 0.001$ unless otherwise noted): Active social media use was significantly positively correlated with bonding offline social capital ($r = 0.43$) and bridging offline social capital ($r = 0.40$). Passive social media use was significantly negatively correlated with bonding offline social capital ($r = -0.27$) and not significantly correlated with bridging offline social capital ($r = 0.07$, $p > 0.05$). Cognitive empathy was significantly positively correlated with active social media use ($r = 0.39$), bonding offline social capital ($r = 0.51$), and bridging offline social capital ($r = 0.46$). Affective empathy showed similar correlation patterns to cognitive empathy: positive correlations with active social media use ($r = 0.41$), bonding offline social capital ($r = 0.53$), and bridging offline social capital ($r = 0.48$). No significant multicollinearity was detected, as all variance inflation factors (VIF) were below 2.2 (Hair et al., 2022).

4.1.2 Direct Effects of Social Media Use on Offline Social Capital

Hierarchical multiple regression analyses (controlling for covariates) confirmed the direct effects of social media use on offline social capital:

For bonding offline social capital: Step 1 (covariates) explained 10% of the variance ($F = 21.89$, $p < 0.001$). Step 2 (adding active and passive social media use) explained an additional 19% of the variance ($\Delta F = 267.54$, $p < 0.001$). Active social media use had a significant positive effect ($\beta = 0.29$, $p < 0.001$), confirming H1a. Passive social media use had a significant negative effect ($\beta = -0.18$, $p < 0.001$), confirming H2a.

For bridging offline social capital: Step 1 (covariates) explained 9% of the variance ($F = 19.76$, $p < 0.001$). Step 2 (adding active and passive social media use) explained an additional 16% of the variance ($\Delta F = 215.32$, $p < 0.001$). Active social media use had a significant positive effect ($\beta = 0.26$, $p < 0.001$), confirming H1b. Passive social media use had a non-significant effect ($\beta = 0.05$, $p > 0.05$), confirming H2b.

4.1.3 Moderating Role of Empathy

Moderation analysis using the PROCESS macro (Model 1) revealed the moderating role of cognitive and affective empathy:

For the relationship between active social media use and bonding offline social capital: The interaction term between active social media use and cognitive empathy was significant ($\beta = 0.12$, $p < 0.001$), indicating that cognitive empathy strengthens the positive relationship. Simple slope analysis showed that the positive effect of active social media use on bonding offline social capital was stronger for individuals with high cognitive empathy ($\beta = 0.41$, $p < 0.001$) than for those with low cognitive empathy ($\beta = 0.17$, $p < 0.001$), confirming H3a. The interaction term between active social media use and affective empathy was also significant ($\beta = 0.13$, $p < 0.001$), with a stronger positive effect for individuals with high affective empathy ($\beta = 0.43$, $p < 0.001$) than for

those with low affective empathy (β = 0.15, p < 0.001), confirming H4a.

For the relationship between active social media use and bridging offline social capital: The interaction term between active social media use and cognitive empathy was significant (β = 0.10, p < 0.001), with a stronger positive effect for individuals with high cognitive empathy (β = 0.36, p < 0.001) than for those with low cognitive empathy (β = 0.16, p < 0.001), confirming H3b. The interaction term between active social media use and affective empathy was significant (β = 0.11, p < 0.001), with a stronger positive effect for individuals with high affective empathy (β = 0.38, p < 0.001) than for those with low affective empathy (β = 0.14, p < 0.001), confirming H4b.

For the relationship between passive social media use and bonding offline social capital: The interaction term between passive social media use and cognitive empathy was significant (β = -0.09, p < 0.001), indicating that cognitive empathy weakens the negative relationship. Simple slope analysis showed that the negative effect of passive social media use on bonding offline social capital was weaker for individuals with high cognitive empathy (β = -0.09, p < 0.05) than for those with low cognitive empathy (β = -0.27, p < 0.001), confirming H5a. The interaction term between passive social media use and affective empathy was significant (β = -0.10, p < 0.001), with a weaker negative effect for individuals with high affective empathy (β = -0.08, p < 0.05) than for those with low affective empathy (β = -0.28, p < 0.001), confirming H5b.

4.1.4 Cross-Cultural Analysis

Multigroup regression analyses revealed minimal cross-cultural variations. The direct and moderating effects were generally consistent across the five countries. The only minor variation was in the strength of the relationship between active social media use and bridging offline social capital, which was stronger in collectivistic cultures (China, India, Ghana) (β = 0.30–0.32) than in individualistic cultures (Germany, Spain) (β = 0.24–0.25). However, the interaction terms between country and social media use were not statistically significant (all p > 0.05), suggesting that the patterns of relationships are generally universal across the five cultural contexts.

4.2 Qualitative Results

Thematic analysis of the interview data identified four main themes related to social media use, empathy, and offline social capital among digital natives:

4.2.1 Active Social Media Use as a Catalyst for Offline Social Connection

Most interview participants reported that active social media use helped them maintain and strengthen offline relationships. They used social media to coordinate offline gatherings, share daily experiences, and stay in touch with friends and family who lived far away. As one participant from China noted: „I use WeChat to chat with my high school friends every day, and we often organize offline dinners or trips through WeChat. This makes our relationship as close as before even though we are in different cities.“ Active social media use also helped participants expand their offline social networks by connecting with people who shared similar interests. A participant from India stated: „I joined a photography group on Facebook, and we often have offline photo walks. Through these activities, I met many new friends who share my hobby, and this has expanded my social circle.“

4.2.2 Passive Social Media Use as a Barrier to Offline Social Interaction

Participants reported that excessive passive social media use reduced their willingness and time to engage in offline social interactions. They often spent hours scrolling through social media feeds, which made them feel tired and less motivated to meet friends or family. A participant from Germany said: „When I get home from school, I usually scroll through Instagram for a few hours. By the time I finish, I don‘t have the energy to go out and meet friends anymore. Sometimes I even decline invitations because I want to continue browsing social media.“ Passive social media use also led to feelings of isolation and envy, which further hindered offline social interaction. A participant from Spain noted: „I often see others posting about their happy

offline activities on social media, which makes me feel left out. Instead of going out to make new friends, I just keep scrolling, which makes me more isolated."

4.2.3 Empathy Facilitates the Translation of Online Interactions into Offline Social Capital

Participants with high empathy reported that they were better able to translate online interactions into offline relationships. They used their empathy to understand others' needs and perspectives during online interactions, which helped them establish trust and emotional connections. A participant from Ghana said: „When I chat with others on social media, I always try to understand their feelings. For example, if someone is feeling stressed about exams, I will listen to them and offer support. This makes them more willing to meet me offline, and we can become real friends." Empathy also helped participants maintain offline relationships by being more responsive to others' needs. A participant from China stated: „I remember my friend's birthday through social media, and I will send her a gift or meet her offline to celebrate. This shows that I care about her, and our relationship becomes stronger."

4.2.4 Strategies for Balancing Online and Offline Social Lives

Participants reported various strategies to balance online and offline social lives. Most participants set time limits for social media use to avoid excessive passive browsing. For example, a participant from Germany said: „I set a 1-hour limit for scrolling through social media every day. Once the time is up, I put down my phone and do other things, like reading or meeting friends." Participants also actively used social media to plan offline activities, turning online interactions into offline experiences. A participant from India noted: „Instead of just chatting online, I often suggest offline meetings with my online friends. For example, we can go to a café or a park to talk face-to-face, which helps us build stronger relationships." Additionally, participants with high empathy reported that they actively practiced empathy in both online and offline interactions to enhance social connections.

5. Discussion

5.1 Main Findings

The present study adopts a mixed-methods and cross-cultural approach to investigate the relationship between social media use (active vs. passive) and offline social capital (bonding vs. bridging) among digital natives, and the moderating role of empathy (cognitive vs. affective). The key findings are summarized as follows:

First, active social media use positively predicts both bonding and bridging offline social capital, while passive social media use negatively predicts bonding offline social capital and has no significant effect on bridging offline social capital. This finding resolves the inconsistency in previous research by distinguishing between active and passive social media use. Active use involves interaction and content creation, which strengthens existing close relationships and expands social networks, thereby promoting offline social capital (Ellison et al., 2021; Chen et al., 2023). Passive use, in contrast, displaces time spent on offline interactions with close others, weakening bonding social capital, but has no significant effect on bridging social capital due to the weak nature of bridging ties (Kross et al., 2021; Caplan, 2021). The qualitative findings further confirm that digital natives use active social media use to maintain and expand offline relationships, while passive use hinders offline social interaction.

Second, empathy (cognitive and affective) plays a significant moderating role in the relationship between social media use and offline social capital. For active social media use, high empathy strengthens the positive relationship with offline social capital, as individuals with high empathy are better able to establish emotional connections online and translate them into offline relationships (Batson et al., 2021; Mikolajczak & Luminet, 2022). For passive social media use, high empathy weakens the negative relationship with bonding offline social capital, as individuals with high empathy are less likely to withdraw from offline social interactions due to passive browsing (Reinecke et al.,

2021; Hatfield et al., 2014). This finding highlights the importance of empathy as a protective factor that enhances the positive effects of active social media use and mitigates the negative effects of passive use.

Third, the patterns of relationships between social media use, empathy, and offline social capital are generally consistent across the five cultural contexts. Minor cross-cultural differences in the strength of the relationship between active social media use and bridging offline social capital do not alter the core mechanisms, suggesting that these relationships are relatively universal. This enhances the generalizability of the study‘s findings and supports the cross-cultural validity of the theoretical framework (Ellison et al., 2021; Palfrey & Gasser, 2021).

5.2 Theoretical Implications

The present study makes several important theoretical contributions to media psychology and digital behavior research:

First, it enriches the literature on social media use and social capital by distinguishing between active and passive social media use and exploring their differential effects on offline social capital. Previous research has often treated social media use as a unidimensional construct, leading to conflicting findings (Kross et al., 2021; Ellison et al., 2021). By demonstrating that active use promotes offline social capital while passive use undermines bonding offline social capital, the study provides a more nuanced understanding of the relationship between social media use and offline social outcomes.

Second, it identifies empathy as a key moderating mechanism linking social media use to offline social capital. Previous research has focused on the direct effects of social media use on social capital, neglecting the role of individual differences in psychological traits (Valkenburg & Peter, 2022; Liu et al., 2023). By demonstrating that empathy moderates the relationship between social media use and offline social capital, the study fills this gap and contributes to the development of a more comprehensive theoretical model that incorporates individual differences.

Third, it extends the concept of social capital to the offline context for digital natives. By focusing on digital natives‘ offline social capital, the study provides insights into how digital media use affects their traditional social lives. The findings suggest that digital natives‘ social media use can either promote or hinder offline social capital accumulation, depending on the type of use and individual empathy levels, reflecting the complex integration of online and offline social lives in the digital era.

Fourth, the cross-cultural consistency of the findings enhances the theoretical generalizability of the relationships between social media use, empathy, and offline social capital. Previous research on social media use and social capital has often been limited to single-country samples (Ellison et al., 2021; Palfrey & Gasser, 2021). By demonstrating consistent patterns across diverse cultural contexts (individualistic and collectivistic), the study provides evidence that the psychological mechanisms underlying these relationships are relatively universal, strengthening the theoretical validity of the findings.

5.3 Practical Implications

The findings of this study have important practical implications for digital natives, educators, social media platform developers, and policymakers:

For digital natives: The study provides guidance for balancing online and offline social lives to promote offline social capital accumulation. Digital natives should prioritize active social media use (e.g., interacting with others, creating content) and reduce excessive passive use (e.g., mindless scrolling). They should also cultivate empathy to enhance their ability to establish emotional connections online and translate them into offline relationships. Setting time limits for social media use and using social media to plan offline activities are effective strategies for balancing online and offline social lives.

For educators: Schools and universities should integrate digital literacy and emotional intelligence education into the curriculum, focusing on teaching digital natives to use social media actively and develop

empathetic skills. Educational activities (e.g., group discussions, role-playing) can be designed to help digital natives understand the differential effects of active and passive social media use on offline social relationships and learn strategies for balancing online and offline social lives.

For social media platform developers: Platforms should design features that encourage active social media use and reduce excessive passive use. For example, they can develop tools to promote interaction (e.g., group chat functions, event planning tools) and implement features that remind users of their browsing time to prevent excessive passive use. Platforms can also design algorithms that prioritize content that fosters empathy and positive social interactions, promoting the translation of online interactions into offline relationships.

For policymakers: Policymakers should develop and implement policies to promote healthy social media use among digital natives. This includes supporting digital literacy and emotional intelligence education programs, regulating social media platforms to reduce excessive passive use, and encouraging research on the relationship between digital media use and offline social outcomes. Policymakers can also collaborate with civil society organizations to raise awareness about the importance of balancing online and offline social lives.

5.4 Limitations and Future Research Directions

Despite its contributions, the present study has several limitations that should be acknowledged, providing directions for future research:

First, the cross-sectional design of the survey limits the ability to establish causal relationships between variables. While the moderation analysis provides insights into the potential mechanism, it cannot confirm the direction of causality. For example, it is possible that offline social capital also influences social media use and empathy. Future research should adopt longitudinal designs to track changes in variables over time and establish more robust causal inferences.

Second, the study relies on self-report measures for the survey, which may be subject to response biases (e.g., social desirability bias). Participants may overreport active social media use and underreport passive use to align with societal expectations. Future research could complement self-report data with objective measures, such as behavioral tracking of social media use (e.g., app usage data) and observational measures of offline social interactions.

Third, while the interview sample provides in-depth insights, it is relatively small (42 participants) and may not be fully representative of all digital natives. Future research could conduct larger-scale qualitative studies or mixed-methods studies with more diverse samples to enhance the external validity of the qualitative findings.

Fourth, the study does not examine the role of social media platform type in the relationship between social media use and offline social capital. Different platforms (e.g., WeChat, Instagram, Facebook) have distinct features and user cultures, which may influence the type of social media use (active vs. passive) and its relationship with offline social capital. Future research should explore how platform type moderates the relationships between variables.

Fifth, the study focuses on cognitive and affective empathy, but other dimensions of empathy (e.g., compassionate empathy) may also play a role in the relationship between social media use and offline social capital. Future research could expand the scope of empathy to include other dimensions and explore their unique moderating effects.

Sixth, the study does not explore potential moderating variables, such as personality traits (e.g., extraversion, neuroticism) or offline social network size. These variables may influence the relationship between social media use and offline social capital. For example, extraverted individuals may be more likely to engage in active social media use and translate online interactions into offline relationships. Future research should investigate these moderating variables to further clarify the boundary conditions of the relationships.

6. Conclusion

The present study systematically investigates the relationship between social media use (active vs. passive) and offline social capital (bonding vs. bridging) among digital natives, and the moderating role of empathy (cognitive vs. affective), using a mixed-methods and cross-cultural design. The findings reveal that active social media use positively predicts both bonding and bridging offline social capital; passive social media use negatively predicts bonding offline social capital and has no significant effect on bridging offline social capital; and cognitive and affective empathy moderate these relationships. These patterns are generally consistent across diverse cultural contexts.

This study contributes to media psychology and digital behavior research by providing a nuanced understanding of the relationship between social media use and offline social capital, identifying empathy as a key moderating mechanism, and enhancing the generalizability of findings through a cross-cultural mixed-methods design. Practically, the study provides actionable insights for digital natives to balance online and offline social lives, and for educators, platform developers, and policymakers to support digital natives' healthy offline social capital construction.

Future research should build on these findings by adopting longitudinal designs, using mixed methods with objective measures, and exploring the role of platform type, additional empathy dimensions, and moderating variables. Overall, this study advances our understanding of how digital natives' social media use shapes their offline social capital, underscoring the importance of active social media use and empathy in promoting healthy social development in the digital era.

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