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The Conditional Effects of Internet Use on Well-being: Heterogeneous Trust Mechanisms and the Boundary of Subjective Social Status

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Research Article

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Abstract

The increasing integration of the internet into public life has ignited an intense academic debate regarding whether digital technology fundamentally fosters or erodes social capital and subjective well-being. To address this complexity, our study rigorously utilized the Lagged Fixed Effects (LFE) model and multi-period panel data from the China Family Panel Studies (CFPS) to examine the long-term, cross-period causal structure of internet use and well-being. The research confirms a highly conditional and heterogeneous dual-track mechanism. While internet use generates psychological costs via family and neighbourhood trust (bonding capital), its ability to foster stranger trust (bridging capital) is strictly contingent upon subjective class identity. However, even for individuals with higher class recognition who successfully accumulate this bridging trust, it ultimately lacks the emotional depth to translate into long-term subjective well-being. Crucially, the study found a persistent barrier preventing this interpersonal trust from converting into institutional trust, despite political trust being the key driver of long-term well-being. By uncovering these asymmetric mechanisms and boundary conditions, this research significantly advances social capital theory and social comparison theory in the digital context. The findings provide crucial evidence for understanding the digital well-being paradox, offering targeted insights for public governance aimed at mitigating the unequal distribution of digital benefits across different social strata.

Introduction

The pervasive integration of the internet into public life has sparked intense academic debate regarding its impact on subjective well-being (SWB). While the digital environment empowers connectivity, it concurrently risks alienating individuals, underscoring a persistent *digital well-being paradox* (Diener et al., 1999; Diener et al., 2003; Yap & Lim, 2024; McLean et al., 2025; Silchenko, 2025). This scholarly divergence suggests that the transition from digital connectivity to psychological well-being is not linear, but rather governed by complex, often contradictory, mediating mechanisms.

To unravel this paradox, extant research frequently utilizes Social Capital Theory, positing that internet use fosters social ties and trust, subsequently enhancing SWB. However, a critical limitation is the tendency to treat trust as a monolithic construct. This unidimensional view overlooks the profound theoretical insight that trust is inherently heterogeneous. This paper addresses this underdeveloped issue, demonstrating that trust heterogeneity can actually flip the sign of internet use effects. Treating trust as a single mediator conceals both the benefits and the psychological costs of digital engagement, particularly within China's unique differential trust structure (Fei, 1992; Li, 2012).

Accordingly, this study explores two core questions: (1) How does internet usage influence SWB through the distinct mediating pathways of stranger (bridging), family-neighbour (bonding), and political (institutional) trust? (2) How does subjective class identity condition these mechanisms?

This study is theory-driven, with social capital theory serving as the focal lens for explaining how internet use shapes trust-based resources. Differential trust pattern theory complements this lens by clarifying

why trust is not a single construct in China and why trust directed at close ties, generalized others, and institutions operate through distinct mechanisms. Social comparison theory further explains why subjective class identity conditions whether internet-enabled exposure translates into beneficial trust. Theory selection strictly follows the IMPACT logic (Hollebeek et al., 2025): interestingness lies in explaining why the same digital behaviour generates both social gain and psychological cost; matching aligns each trust dimension with its theoretical mechanism; parsimony limits the framework to the necessary trust pathways; applicability links findings to concrete well-being concerns; conceptual rigor specifies clear boundary conditions; and testability anchors each claim to panel-based empirical tests.

Utilizing four waves of longitudinal data from the China Family Panel Studies (2016–2022) and employing a lagged fixed-effects approach, this research estimates cross-period associations while mitigating unobserved time-invariant confounding. Moving beyond the limitations of cross-sectional scale data, we introduce subjective class identity as a critical boundary condition.

Guided by the typologies of theory development (Lim, 2026), this study contributes through theoretical modification and extension. First, we extend social capital theory by uncovering the hidden costs of digital connectivity. We critically demonstrate that internet-enhanced bonding trust (family and neighbours) acts as a psychological burden in a digitally mediated environment, highlighting the cultural specificity of strong ties. Second, we expand boundary conditions by demonstrating a structural paradox in digital bridging trust. While higher subjective class identity enables individuals to successfully convert internet use into stranger trust, this digitally acquired capital remains emotionally superficial, failing to deliver SWB gains across all class strata. Theoretical interestingness arises in revealing the illusion of digital social capital, as the internet reinforces structural inequalities in network building, yet these networks ultimately prove hollow for deep psychological fulfilment. Third, we contribute to political trust literature by clarifying the boundaries of digital social capital. We reveal that digitally formed interpersonal trust struggles to cross structural barriers to enhance institutional (political) trust, clarifying which trust pathways are actually available for policy leverage.

Literature Review

Internet Usage and Subjective Well-Being

As internet technology increasingly permeates public life, its impact on subjective well-being (SWB) is highly complex and multifaceted. The internet offers significant benefits by enhancing political transparency, daily efficiency, and interpersonal connections (Becchetti et al., 2021; Büchi et al., 2018; Yang et al., 2022; Yoon, 2014; Zhang & Li, 2023). It facilitates instantaneous, low-cost communication that transcends time and space, provides broad access to information, and fosters diverse community support, particularly for marginalized groups (DiMaggio et al., 2001; Cardozo, 2023).

However, these benefits are countered by documented risks. Excessive internet use is associated with fragmented attention, social comparison, and cyberbullying, which can persistently erode mental health

and trigger anxiety and loneliness (McCrae et al., 2017; Shensa et al., 2020). For instance, internet-addicted groups show pronounced levels of depression and suicidal ideation (Seabrook et al., 2016).

While digital engagement serves as a valuable resource for connectivity, it simultaneously acts as a catalyst for social comparison and psychological burden (De Hesselle & Montag, 2024; Mathy & Cooper, 2003). Consequently, positing a strictly unidirectional effect on SWB is theoretically insufficient. Aligning with the digital well-being paradox, the direct effect of internet use on well-being may be deeply contested. Therefore, rather than assuming a uniform outcome, this study proposes the following competing hypotheses to capture the baseline relationship before introducing our trust-based mechanisms:

Hypothesis 1a (The Enhancement Hypothesis): Internet usage is positively associated with residents' subjective well-being.

Hypothesis 1b (The Burden Hypothesis): Internet usage is negatively associated with residents' subjective well-being.

Internet Usage and Heterogeneous Interpersonal Trust: Bridging Gains and Bonding Costs

The classic distinction between particularistic (bonding) trust and universalistic (bridging) trust is central to understanding Chinese society's differential trust pattern (Fei, 1992). Universalistic trust extends to generalized others and non-kin (strangers), forming bridging social capital, while particularistic trust is based on strong kinship or geographical ties (family and neighbors), forming bonding social capital (Coleman, 1988; Portes, 2000; Putnam, 2000; Hall et al., 2021).

While traditional frameworks often assume the internet uniformly enhances interpersonal trust, differentiating these trust targets reveals a divergent mechanism. Regarding bridging trust, the prevailing view indicates a positive association. The internet functions as a low-cost, boundary-spanning tool that effectively reduces communication barriers, allowing individuals to connect with heterogeneous groups and accumulate stranger trust (Ratan et al., 2010). Because this expanded social network provides novel social support and fulfills psychological needs, it translates into higher subjective well-being (SWB) (Martínez et al., 2019; Li et al., 2025).

Therefore, we hypothesize:

H2: Internet usage positively influences stranger trust.

H3: Internet usage exerts a positive indirect effect on subjective well-being through the mediation of stranger trust.

Conversely, the impact of internet use on bonding trust (family and neighbors) may paradoxically manifest as a hidden psychological cost. In the digital age, ubiquitous social platforms (such as WeChat in China) facilitate perpetual connectivity, which can continuously reinforce and intensify interactions within primary social circles (Davidow, 2011). While traditional social capital theory assumes strong ties are unequivocally beneficial, digital "over-connection" fundamentally alters this dynamic. The constant online presence blurs personal boundaries, subjecting individuals to inescapable social surveillance, rigid reciprocal norms, and the heavy emotional labor required to maintain these strong ties (Van Bruyssel et al., 2024; Zhou, 2019). Consequently, rather than providing liberating social support, this digitally intensified bonding trust transforms into a psychological burden (Rotter, 1980; Horak et al., 2022). This inescapable network of localized obligations and constant social presence ultimately diminishes overall life satisfaction. Thus, we propose:

H4: Internet usage positively influences family and neighbourhood trust.

H5: Internet usage exerts a negative indirect effect on subjective well-being through the mediation of family and neighbourhood trust.

Internet Usage, Political Trust, and Subjective Well-Being

The widespread adoption of internet technology also exerts a complex influence on public political (institutional) trust. While the internet facilitates information flow, higher usage frequently exposes individuals to unverified critical discourse, governance flaws, or social inequalities, which can incrementally erode institutional confidence (You & Wang, 2020).

Cross-national analyses consistently show that frequent internet use can widen the gap between heightened democratic expectations and perceived government performance, negatively impacting institutional trust (Howard, 2010; Norris, 2011).

Political trust is a well-documented macro-level driver of SWB. High levels of institutional trust reduce perceived societal uncertainty by strengthening expectations of institutional safeguards and life stability (Cárcaba et al., 2022). It reflects public confidence in policy response mechanisms; when citizens believe their concerns are systematically addressed, their well-being significantly increases (Hamilton et al., 2016). Therefore, if internet usage compromises political trust, it subsequently removes a critical pillar of subjective well-being. Based on this mechanism, we propose:

H6: Internet usage negatively influences political trust.

H7: Internet usage exerts a negative indirect effect on subjective well-being through the mediation of political trust.

Subjective Class Identity as a Boundary Condition

Subjective class identity refers to an individual's self-perception and emotional identification with their position in the social hierarchy (Weber, 1968). This identity serves as a critical socio-psychological filter regulating this conversion (Hargittai, 2001).

Individuals with a high subjective class identity generally possess greater psychological security, cognitive resources, and optimism (Uslaner, 2002). This enables them to use the internet strategically, approaching unfamiliar online environments with confidence to cultivate generalized trust and extract bridging resources (Miao, 2023). In contrast, those with lower subjective class identity often experience higher baseline vulnerability and resource anxieties (Zhang et al., 2025). For them, the digital environment may appear riskier, limiting their capacity or willingness to transform digital connectivity into genuine stranger trust (CAI & HOU, 2014; CHEN & YANG, 2025; Bagherianziarat & Hamplová, 2025) Therefore, subjective class identity acts as a boundary condition, determining whether online exposure successfully translates into beneficial forms of generalized trust.

H8: Subjective class identity positively moderates the relationship between internet usage and stranger trust; specifically, the positive effect of internet use on stranger trust is stronger for individuals with higher subjective class identity.

Therefore, we construct the following theoretical model (see Figure 1):

Method

The data for our study are sourced from the China Family Panel Studies (CFPS), a nationwide longitudinal fixed-sample tracking survey conducted by the Institute of Social Science Surveys (ISSS) at Peking University. This project systematically collects microdata at the individual, household, and community levels to monitor and analyse dynamic changes across multiple dimensions of Chinese society. Its findings primarily provide empirical evidence for academic discourse and public policy formulation. Specific survey topics encompass employment status, educational attainment, family structure and interactions, population mobility, and physical and mental health conditions. To maintain panel data continuity and variable consistency, exclusion method was applied to address missing values. The resulting valid sample comprises 14,328 observations from 3,582 residents tracked longitudinally across four waves of data: 2016, 2018, 2020, and 2022.

Subjective well-being is the dependent variable in our study. The CFPS data poses the question, "To what extent are you satisfied with your life as a whole?" The scale ranges from 1 to 5, with 1 representing 'very dissatisfied' and 5 representing 'very satisfied'. Responses are scored on a scale of 1 to 5, with 1 representing the weakest response and 5 representing the strongest.

Internet usage is the core independent variable in our research. In the context of surveying internet usage, the CFPS data typically poses the following questions: "Do you use mobile internet?" and "Do you use computer internet?" The values assigned to the responses were as follows: 1 for "yes" responses and 0 for "no" responses. Furthermore, the CFPS data inquired about the frequency of public

consumption, daily activities, and shopping on internet platforms. The following scale was utilized: 1 = Almost daily, 2 = 3–4 times per week, 3 = 1–2 times per week, 4 = 2–3 times per month, 5 = Once per month, 6 = Once every few months, 7 = Never. The integration of these scores with the initial two questions resulted in the formation of a novel variable pertaining to internet usage (Blank & Groselj, 2014). To ensure that higher numerical values represent a higher frequency of digital engagement, the original frequency scales (1–7) were reverse-coded prior to aggregation.

In our study, interpersonal trust and political trust function as mediating variables. Interpersonal trust is further categorized into two distinct types: stranger trust and trust in close relatives and neighbours. The CFPS data on stranger trust includes questions such as "How much do you trust Individuals from other countries?", "How much do you trust strangers?"; while questions on trust in close relatives and neighbours include "How much do you trust your parents?" and "How much do you trust your neighbours?" The CFPS data on political trust primarily comprises questions regarding the extent of trust placed in local government officials. The scoring scale employed for all trust surveys ranges from 0 to 10, where 0 denotes a high level of distrust and 10 denotes a high level of trust.

The concept of subjective class identity is proposed as the moderating variable in our study. Subjective class identity was measured by asking respondents to rate their social status within their local community on a scale from 1 (very low) to 5 (very high). Furthermore, the study's control variables encompass gender (1 = male, 0 = female), age, personal income (logarithmically transformed), educational attainment (measured on an 8-point scale ranging from 1 = illiterate/semi-illiterate to 8 = doctoral degree), hukou registration (1 = non-agricultural, 0 = agricultural), residence (1 = urban, 0 = rural), and marital status (1 = married, 0 = unmarried), which are standard demographic controls identified in previous studies (Graham & Chattopadhyay, 2013; Rodríguez-Pose & Maslauskaite, 2012).

To rigorously test the cross-period causal effect and address potential endogeneity, we employ the Lagged Fixed Effects (LFE) model. The LFE model incorporates the dependent variable lagged by one period (Yt-1) alongside the individual fixed effects (ui). This approach offers a significant advantage by simultaneously controlling for unobserved time-invariant individual heterogeneity and crucial dynamic endogeneity, which arises when the outcome variable influences the predictor in the subsequent period. Therefore, the LFE model provides a more robust and conservative causal estimate than simple OLS or standard Fixed Effects models when analysing the dynamic relationship between internet use and subjective well-being over time. Furthermore, to enhance statistical power and ensure the reliability of our findings, we utilized the Bootstrap method with 5,000 resamples to calculate the 95% confidence intervals for all indirect effects in the mediation and moderated mediation analyses.

Results

Descriptive Statistics

The statistical characteristics of the variables suggest several notable patterns in the sample distribution (see Table 1). Internet usage has a mean score of 1.69, with its positive skewness (0.554) indicating a relatively dispersed usage pattern that leans slightly toward the lower end of the 1-to-3 scale. The mean score for subjective class identity is 0.80; its strong negative skewness (-1.683) across a wide range (-8.7 to 2.5) implies that while the average sits lower numerically, a heavy concentration of respondents identify with the higher end of their perceived class strata, offset by a long tail of individuals reporting significantly lower subjective status.

Table 1 Descriptive Statistics for Each Variable

Variable	N	Average	Std. Dev.	Skewness	Min	Max
Subjective class identity	14328	0.80	0.96	-1.683	-8.7	2.5
Family and Neighborhood trust	14328	13.60	5.47	-1.395	1.0	19.0
Stranger trust	14328	7.48	4.39	0.035	1.0	19.0
Political trust	14328	5.38	2.64	-0.185	0.0	10.0
Subjective well-being	14328	3.90	0.99	-0.658	1.0	5.0
Internet Use	14328	1.69	0.73	0.55	1.0	3.0
Age	14328	51.92	13.62	-0.05	14.0	93.0
Gender	14328	0.56	0.50	-0.24	0.0	1.0
Education	14328	2.27	1.69	0.84	0.0	8.0
Hukou registration	14328	0.23	0.42	1.27	0.0	1.0
Residence	14328	0.50	0.50	-0.01	0.0	1.0
Marriage	14328	0.87	0.34	-2.17	0.0	1.0
ln Personal Income	14328	1.02	0.63	1.02	0	6.54

Regarding the trust measures, family and neighborhood trust (mean 13.60) is highly concentrated toward the top of the 19-point scale, supported by a strong negative skew (-1.395). This suggests that a majority of respondents tend to report high levels of trust within their close social circles. In contrast, stranger trust (mean 7.48) exhibits a more dispersed and highly symmetrical distribution (skewness 0.035), which reflects considerable variation and general caution in public attitudes toward trusting strangers. Political trust (mean 5.38) falls squarely within the middle range, with a slight negative skew (-0.185) showing a mild tendency toward institutional recognition. Furthermore, subjective well-being has a high mean of 3.90 on a 5-point scale, confirming that the overall reported happiness level in the surveyed group is generally elevated.

Table 2 Pearson Correlation Matrix of Key Study Variables

Variable	Family/Neighbor Trust	Stranger Trust	Political Trust	Subjective Class	Well-being	Internet Use
Family/Neighbor Trust	1.000					
Stranger Trust	0.138***	1.000				
Political Trust	-0.040***	0.230***	1.000			
Subjective Class	0.135***	0.105***	-0.049***	1.000		
Well-being	-0.089***	0.031***	0.237***	-0.028***	1.000	
Internet Use	0.137***	0.111***	-0.043***	0.409***	-0.073***	1.000

*p<0.05, **p<0.01, ***p<0.001

Table 2 presents the Pearson correlation coefficient matrix, revealing the complex structural associations among the core variables and laying the empirical foundation for subsequent mechanism analyses (see Table 2). Among the results, the most salient relationship exists between subjective class identity and internet use, which exhibit a strong positive correlation ($r = 0.409$, $p < 0.001$). This confirms that a higher perceived social stratum is a crucial precondition or correlate for individual digital engagement.

Regarding the primary variable of interest, internet use demonstrates a heterogeneous association with different dimensions of trust. It is significantly and positively correlated with both family/neighbor trust ($r = 0.137$, $p < 0.001$) and stranger trust ($r = 0.111$, $p < 0.001$), yet it shows a negative correlation with political trust ($r = -0.043$, $p < 0.001$). This suggests that while internet usage may expand horizontal social networks and generalized trust, it might subtly erode vertical institutional trust.

Furthermore, subjective well-being exhibits a highly differentiated pattern when associated with these trust dimensions. It is most strongly and positively correlated with political trust ($r=0.237$,$p<0.001$), indicating that institutional confidence is a vital psychological anchor for individual well-being. Conversely, well-being is significantly negatively correlated with family and neighborhood trust ($r=-0.089$,$p<0.001$), preliminarily hinting at the potential emotional burden or eroding effect of traditional acquaintance-based social ties. Notably, internet use itself is significantly negatively correlated with subjective well-being ($r=-0.073$,$p<0.001$), providing initial correlational support for the "well-being paradox" in the digital age.

Collectively, these results demonstrate that the nexus among internet use, multi-dimensional trust, and well-being is intricately interwoven, characterized by a complex structure of coexisting positive network expansions and negative psychological impacts.

Lagged Fixed Effects Model Statistics

Our analysis aims to delve into complex cross-period causal effects and initially confirmed that core variables such as subjective well-being and social trust exhibit significant temporal persistence. To precisely capture this dynamic adjustment characteristic while strictly controlling for all time-invariant individual unobserved heterogeneity, we constructed a Lagged Fixed Effects model (LFE). Furthermore, to rigorously isolate the effects of interest, the model incorporates the 2016 baseline levels of all respective variables, alongside a comprehensive set of demographic controls including age, gender, education, hukou registration, place of residence, and marital status

By utilizing the LFE model, we rigorously eliminated biases caused by all time-invariant individual characteristics, and the multi-period lagged structure (X2018→M2020→Y2022) ensures the temporal precedence required for causal inference. Therefore, employing this rigorous Lagged Fixed Effects approach, we proceeded with an in-depth empirical analysis of the net, cross-period causal effects of internet usage and various forms of trust on subjective well-being. H1b and H2 are supported, while H1a, H4, and H6 are not supported.

Table 3 Lagged Effects of Internet Use on Trust and Well-being

Model	Coeff.	Std. Error	t	p	95% CI [Lower, Upper]	R^2
Internet Use (2018)→Family and Neighborhood trust (2020)	0.178	0.131	1.351	0.177	[-0.080, 0.435]	0.051
Internet Use (2018)→Stranger trust (2020)	0.460^{***}	0.108	4.272	0.000	[0.249, 0.672]	0.039
Internet Use (2018)→Political trust (2020)	-0.020	0.058	-0.339	0.735	[-0.134, 0.094]	0.113
Internet Use (2018)→Subjective well-being (2022)	-0.043^{*}	0.022	-1.966	0.049	[-0.085, -0.001]	0.071

*p<0.05, **p<0.01, ***p<0.001

Note: Higher values for internet use indicate higher frequency due to reverse-coding.

The lagged analysis examines the longitudinal impact of Internet use (measured in 2018) on different dimensions of social trust (measured in 2020) and subjective well-being (measured in 2022). The results reveal divergent cross-period effects of Internet engagement on individuals' social attitudes and psychological outcomes (see Table 3).

First, the model demonstrates a highly significant and robust positive lagged effect of prior Internet use on stranger trust (Coeff. = 0.460, $p < 0.001$). This suggests that increased internet usage significantly

fosters a broader generalized trust toward strangers over time.

Conversely, the analysis reveals a statistically significant, albeit small, negative longitudinal impact on subjective well-being (Coeff. = -0.043, $p < 0.05$). This indicates that higher levels of Internet use in 2018 are associated with a slight decline in individuals' reported subjective well-being four years later in 2022.

In contrast, earlier Internet use does not exert any significant delayed influence on localized or institutional trust. Specifically, the lagged effects on family and neighbourhood trust (Coeff. = 0.178, $p = 0.177$) and political trust (Coeff. = -0.020, $p = 0.735$) are statistically insignificant, with both of their 95% confidence intervals crossing zero. This implies that while Internet use reshapes attitudes toward strangers and personal well-being, it does not meaningfully alter individuals' baseline trust in their immediate social circles or the political system over time.

Table 4 Lagged Effects of Social Trust Dimensions on Well-being

Dependent Variable (2020)	Coeff.	Std. Error	t	p	95% CI [Lower, Upper]	R^2
Family & Neighbor(2020) Trust→ Subjective well-being (2022)	-0.006*	0.003	-2.230	0.026	[-0.012, -0.001]	0.085
Stranger Trust (2020) → Subjective well-being (2022)	-0.006	0.004	-1.602	0.109	[-0.012, 0.001]	0.085
Political Trust (2020) → Subjective well-being (2022)	0.046***	0.006	7.223	0.000	[0.034, 0.059]	0.085

*p<0.05, **p<0.01, ***p<0.001

Table 4 presents the findings from the lagged analysis examining how different dimensions of social trust in 2020 impact subjective well-being in 2022 (see Table 4). The results reveal that various forms of trust exert divergent longitudinal effects on an individual's future psychological outcomes.

Most notably, political trust demonstrates a highly significant and robust positive lagged effect on subsequent subjective well-being (Coeff. = 0.046, $p < 0.001$). This indicates that individuals who reported higher levels of trust in political institutions in 2020 experienced significantly higher subjective well-being two years later.

Conversely, family and neighbor trust exhibits a slight but statistically significant negative longitudinal impact on future well-being (Coeff. = -0.006, $p = 0.026$). This suggests that higher levels of trust concentrated within localized, primary social ties are associated with a marginal decrease in reported well-being over time.

Finally, the lagged effect of stranger trust on subjective well-being is not statistically significant (Coeff. = -0.006, $p = 0.109$). Because the 95% confidence interval crosses zero, there is no conclusive evidence in

this model to suggest that generalized trust toward strangers has a delayed, long-term impact on personal well-being.

Overall, the model (which explains 8.5% of the variance, $R^2 = 0.085$) underscores that social trust is not monolithic in its psychological outcomes. Institutional (political) trust serves as a strong positive predictor for long-term well-being, whereas localized (family and neighbor) trust shows a minor negative association, and generalized (stranger) trust shows no significant temporal effect.

Table 5 Mediation Analysis of the Effect of Internet Use on Subjective Well-being

Effect Pathway	Coeff.	S.E.	95% CI (Lower, Upper)	p
Indirect Effect (via Family & Neighbor Trust)	-0.005*	0.003	(-0.011,-0.000)	0.038
Indirect Effect (via Stranger Trust)	-0.001	0.004	(-0.008,0.007)	0.838
Indirect Effect (via Political Trust)	-0.002	0.003	(-0.009,0.005)	0.602

*p<0.05, **p<0.01, ***p<0.001

Table 5 presents the Bootstrap mediation analysis evaluating the indirect pathways through which Internet use affects subjective well-being via three distinct dimensions of social trust (see Table 5). Among the examined mediators, only family and neighbour trust exhibits a statistically significant indirect effect (Coeff. = -0.005, p = 0.038). Although the direct lagged effect of internet use on family trust was statistically marginal (as shown in Table 3), the rigorous Bootstrap mediation test detected a significant, albeit weak, indirect pathway. In contrast, the indirect pathways through stranger trust (Coeff. = -0.001, p = 0.838) and political trust (Coeff. = -0.002, p = 0.602) are not statistically significant, as both of their 95% confidence intervals cross zero. H5 is supported, while H3 and H7 are not supported.

These findings indicate that a portion of the adverse effect of internet use on well-being is indirectly channelled through its association with localized family and neighbourhood trust, whereas generalized and institutional trust do not serve as significant mediating mechanisms in this specific relationship.

Table 6 Moderating Effect of Subjective Class Identity on Stranger Trust

Mediator (M)	**Moderator (Subjective Class Identity) Level**	**Est.**	**95% CI (Lower, Upper)**	**p**
Stranger trust	Low Subjective Class Identity	0.005	(-0.003,0.014)	0.185
	High Subjective Class Identity	0.011	(0.004,0.019)	0.000*

*p<0.05, **p<0.01, ***p<0.001

Further analysis demonstrates that the internet's capacity to foster stranger trust is subject to significant boundary conditions (see Table 6 & Figure 2). For individuals with a low subjective class identity, internet use fails to significantly foster stranger trust (Est. = 0.005, p = 0.185). However, as an individual's subjective class identity level increases, this effect becomes highly significant (Est. = 0.011, $p < 0.001$), fully supporting H8. This demonstrates that the internet's potential to expand bridging social capital is selectively unlocked by a higher perceived social standing.

Crucially, however, as indicated by the non-significant mediation pathway in Table 5, this unequally distributed bridging capital ultimately hits a dead end. Even for higher-status groups who successfully accumulate digital stranger trust, these weak ties lack the substantive emotional support necessary to effectively translate into subjective well-being.

In conclusion, these findings confirm that an individual's subjective class level serves as a critical boundary condition. It fundamentally determines whether internet use can effectively promote the conversion of positive, generalized social capital and ultimately impact an individual's long-term subjective well-being.

Discussion

Our study rigorously examined the long-term and dynamic effects of internet use on subjective well-being (see Fig. 3 for the specific action pathway). Our findings move beyond the simple "foster or erode" debate by confirming that the effect of Internet on well-being is highly conditional and realized through heterogeneous pathways of social trust. By precisely revealing these distinct mechanisms and boundary conditions, our results redefine the Chinese pathway of social capital in the digital society and offer critical insights for social governance.

Taken together, our research offers a sophisticated, multi-mechanism integrative explanatory framework for the long-term Internet and Well-being Paradox. The overall effect of the internet on well-being is negative. We also found the negative mechanism of the cost of family and neighbourhood trust erodes the well-being of all individuals. In the moderated mediation model, the internet's potential to foster generalized trust among strangers is only accessible to those with a high subjective class identity. This theoretical framework moves beyond a simple benefits-versus-harms debate, emphasizing the critical role of social structure and subjective stratification in the conversion of digital capital, and ultimately reveals the structural asymmetry of digital technology's impact on well-being.

Advancing Hierarchical Political Trust Theory

Our study highlights potential boundary conditions regarding the conversion of interpersonal trust into political trust in the digital age, thereby deepening the understanding of the hierarchical government trust pattern specific to the Chinese context. Existing theories have focused on the potential for a bottom-up conversion of micro-level interpersonal trust to macro-level institutional trust. For instance, Putnam suggests that high levels of trust among social members can be converted into support for the political

system (Putnam, 1966; Norris, 2001). However, within China's singular social and digital ecology, the direct impact of the internet on political trust remains an area demanding theoretical discussion.

Our findings extend theoretical assumptions about the simple spill over of social capital across public and private spheres, fostering deep dialogue with Lianjiang Li's work on hierarchical government trust (L Li,2012). Results show internet use fails to significantly enhance this form of trust. Our longitudinal model finds no significant evidence that general internet use enhances this macro-level institutional trust. This null finding suggests that even if the internet cultivates generalized trust, social capital formed through atomized digital connections may not naturally spill over to cross public-private boundaries and influence public authority (Uslaner, 2004; King et al., 2013; Bolsover, 2017; Kang & Zhu, 2021; Jhang, 2022; Zhan et al., 2025). This prompts reflection that within China's digital governance landscape, effectively activating and guiding the positive effects of social capital to better serve macro-governance objectives remains an important ongoing topic.

Extending Social Capital Theory

On the dimension of strong ties, we confirmed the hidden costs of bonding social capital, thus extending the understanding of traditional social capital theory. Family and neighbourhood trust are typically regarded as classic examples of bonding social capital that support individuals' emotional needs and resource acquisition(D. S. Brisson & Usher, 2005; D. Brisson, 2009). While classical social capital theory consistently promotes the positive role of strong ties, whether these ties incur hidden costs in the digital age, remains a theoretical issue awaiting resolution. Moreover, previous studies are not enough to explain whether such costs are amplified within China's unique differential pattern of association.

While the direct lagged effect of internet use on family trust appears statistically subtle in the aggregate model, our rigorous mediation analysis detects a significant, albeit weak, indirect pathway. This provides preliminary evidence suggesting that family and neighbourhood trust may possess the potential to act as a negative mechanism in the digital well-being paradox. It points to the possibility that, rather than unequivocally enhancing well-being, digitally intensified bonding social capital runs the risk of being alienated into a psychological burden. In China's internet ecosystem, where social software like WeChat are highly prevalent, the state of being always online may lead to over-connection (Davidow, 2011; Zhou, 2019). High levels of trust in a digital context can potentially translate into a heavy burden of human relations, the pressure of constant social presence, and intensified social norm constraints (Gargiulo & Ertug, 2006; Van Bruyssel et al., 2024). Therefore, by utilizing longitudinal data, our study reveals that bonding social capital may have become a negative mechanism in the paradox of digital age well-being, thereby supplementing the literature on the dark side of social capital.

Although internet use successfully fosters stranger trust, this form of bridging social capital does not significantly translate into improved long-term subjective well-being. Despite the internet’s capacity to generate weak ties, the lack of substantial support and emotional depth in such capital prevents the mediation mechanism from being confirmed. This overall pattern does not represent a simple failure of mediation. Instead, our moderation hypothesis (H8) reveals a deep structural paradox. The

transformation of internet use into bridging trust is restricted by individuals' subjective social status and benefits only those with higher perceived class standing. Even so, such resource accumulation does not extend to improvements in well-being. The bridging social capital formed online operates only as a structural resource rather than an emotional resource. It fails to generate lasting improvements in subjective well-being, regardless of class identity.

Expanding Social Comparison Theory

Our research focuses on the potential of bridging social capital to promote well-being in the digital age, and introduces subjective class identity as a boundary condition for this analysis. The traditional technology empowerment hypothesis tends to suggest that digital tools enhance social capital (Choi et al., 2022). However, this hypothesis did not adequately explain how social stratification limits individuals' ability to convert digital resources into positive well-being outcomes(van Deursen & Helsper, 2015).

To answer this question, our study finds that the different levels of subjective class identity interact with internet use on well-being, which engages in a profound dialogue with social comparison theory. Our finding addresses the debate of whether digital connectivity is a true social equalizer or merely a re-manifestation of social inequality on internet usage (Hargittai, 2011; Katz & Gonzalez, 2016). We argue that subjective class identity acts as a filter for social comparison. For those with high class identity, they tend to view the internet as a tool for acquiring heterogeneous information and expanding weak ties. Conversely, individuals with low class identity may be more susceptible to feelings of relative deprivation when encountering idealized lives presented online. Furthermore, while our broad measurement of internet use does not capture specific online activities, these statistical disparities can be contextualized within the structural reality of China's digital economy. In this broader context, researchers have increasingly noted that the 'stranger connections' accessible to lower-status groups are often precarious weak ties shaped by algorithmic exploitation (e.g., the digital gig economy).

This dual disadvantage of psychological deprivation and the inferior structural quality of their digital ties ultimately inhibits their capacity to convert online interactions into beneficial generalized trust. Therefore, our study emphasizes that subjective class identity significantly influences the conversion efficiency of digital capital, providing an important perspective for understanding social inequality in the digital age.

Practical Implications

The Lagged Fixed Effects model applied to our four-year panel data establishes robust causal identification, providing a solid foundation for targeted interventions. Enhancing national well-being requires synergistic, actor-specific efforts targeting distinct empirical mechanisms:

First, directly addressing the negative mediating path of family and neighbourhood trust, digital platform developers must mitigate the psychological burden of over-connectivity. Developers (e.g., WeChat) should design architectural boundaries by incorporating features such as "off-duty" modes and granular notification controls. These technical adjustments empower users to manage heavy reciprocal obligations and limit constant social surveillance.

Second, recognizing that digital bridging capital is structurally unequal yet emotionally insufficient for well-being, interventions must move beyond mere connectivity. While local governments should provide capacity-building to help lower-status groups safely navigate online networks to reduce resource stratification, society as a whole must actively rebuild offline, physically situated community engagements. Relying solely on the internet to foster generalized trust risks trapping individuals in emotionally hollow digital networks.

Third, responding to the persistent barrier preventing interpersonal ties from converting into institutional trust, policymakers must actively optimize digital governance. Since political trust is the strongest long-term predictor of well-being, governments cannot rely on natural social capital spillover. Policymakers should establish highly responsive, trackable online public feedback mechanisms to ensure citizens' digital grievances receive substantive institutional responses, thereby consolidating this structural cornerstone of well-being.

Limitation and Future Directions

Our study confirms important empirical connections, yet the digital sphere invites further methodological and theoretical development. Subsequent research could improve the granularity of measurement by using fine-grained indicators of online purpose to pinpoint effective activities for fostering social trust. Future studies may also benefit from utilizing sophisticated serial mediation models incorporating psychological variables to fully reveal the intricate social comparison effects behind subjective class identity's moderating role. Finally, comparative analyses involving countries with differing social capital structures and governance regimes would be valuable to assess the external validity and boundary conditions of our findings, which are currently grounded in the unique socio-political context of China.

Conclusion

Our study confirms a conditional and heterogeneous dual-mechanism framework that resolves the digital age well-being paradox. The research reveals that the internet's influence is structurally asymmetric: it generates a negative path by amplifying the hidden psychological costs of family and neighbourhood trust. These findings advance social capital theory and social comparison theory by defining the costs and boundary conditions of digital capital conversion, ultimately providing a rigorous, structural explanation for the unequal distribution of digital benefits in the Chinese context.

Declarations

Author Contributions

Qing Wang (WQ) and Xuebo Zhang (ZXB) conceived and designed the study. WQ performed the data extraction, conducted the statistical analyses (including the Lagged Fixed Effects modeling), and drafted the initial manuscript. ZXB supervised the entire research process, provided critical methodological

guidance, and extensively revised the manuscript for important intellectual content. Both authors read and approved the final manuscript.

Ethical Considerations

Not applicable

Consent to participate

Not applicable

Consent for publication:

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Data Availability:

The datasets analyzed during the current study, derived from the China Family Panel Studies (CFPS), are available at the following URL: https://docs.google.com/spreadsheets/d/1eJx-wyAqlR11zrJS3qgZiL2mmteI2Ehp/edit?usp=sharing&ouid=107616459617005785709&rtpof=true&sd=true. The original raw data are publicly available from the Institute of Social Science Survey (ISSS) at Peking University.

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Figures

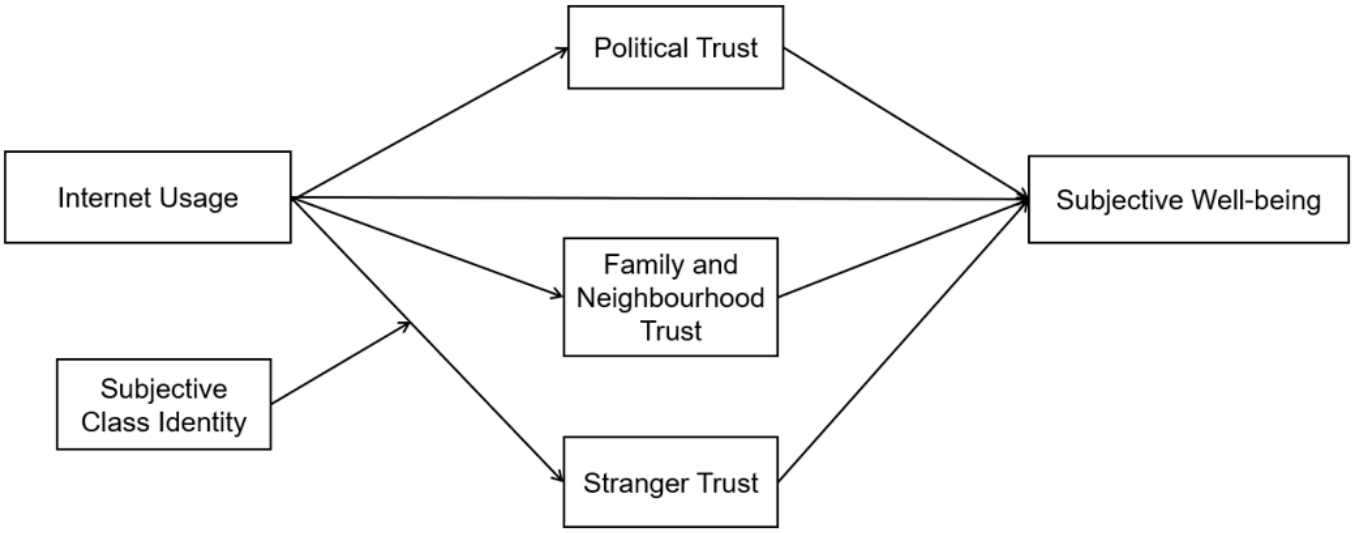


Figure 1

Theoretical Model

Note: Control variables including age, gender, education, hukou registration, residence, and marriage are included in the analyses but omitted from this path diagram for visual clarity.

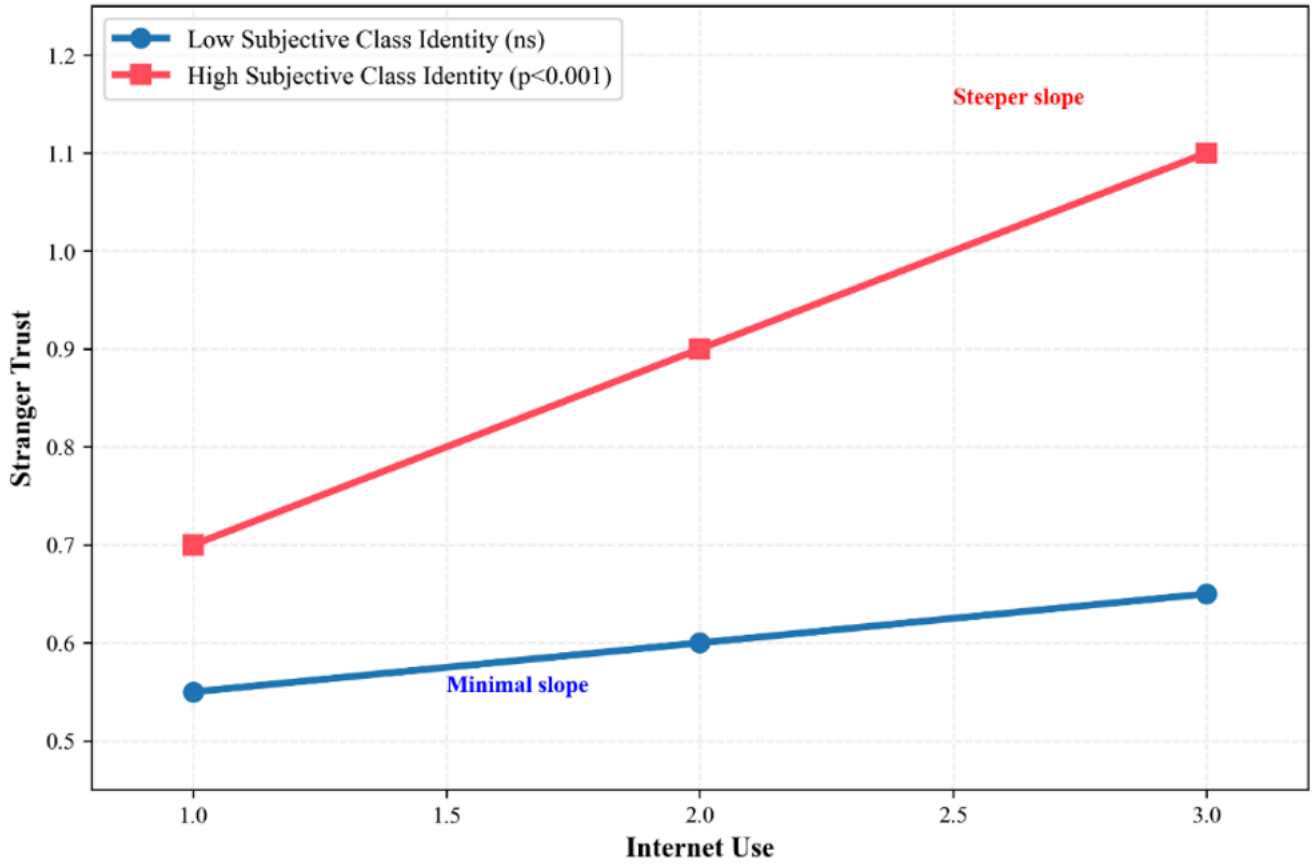


Figure 2

Moderating effect of subjective class identity on the relationship between internet use and stranger trust

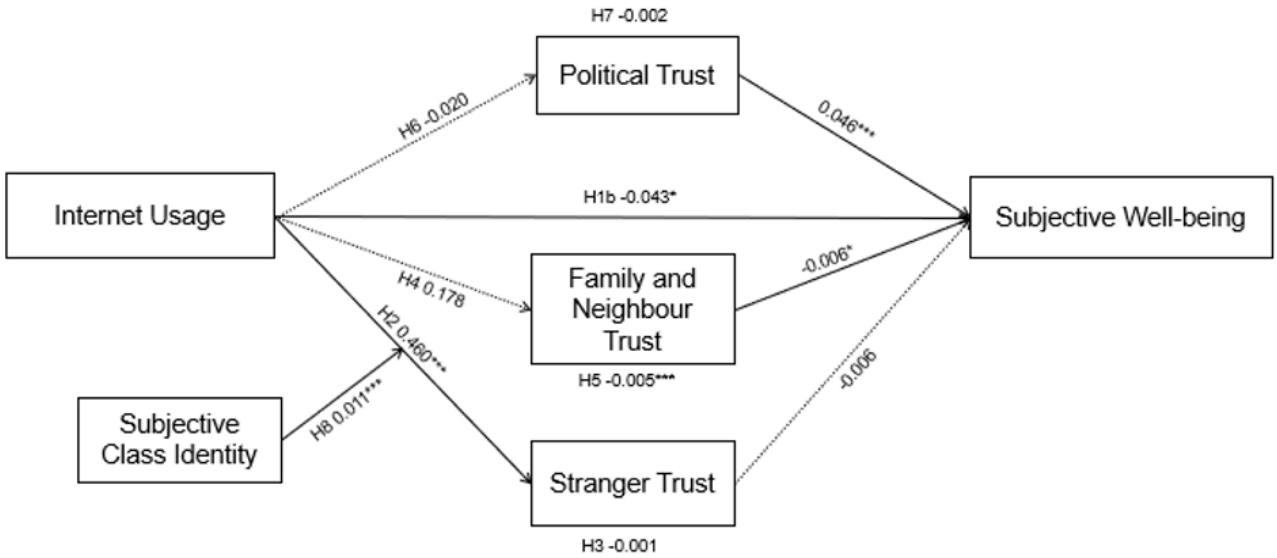


Figure 3

Actual model