The impact of reading on subjective well-being and implications for the publishing industry: evidence from China

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Abstract

The publishing industry considers launching nationwide reading as its responsibility, as the national reading campaign has become a primary national strategy in China. However, research rarely studies how reading impacts on an individuals subjective well-being and the comparison between reading mediums. This study explored how diverse reading mediums affect subjective well-being, using data from the Chinese General Social Survey (CGSS2017). The study found that both paper reading and digital reading can improve individuals' subjective well-being. Besides, loneliness and perceived fair play mediation roles between reading mediums and subjective well-being. The results suggest that the publishing industry should further ramp up the publishing convergence, insist on putting social benefits in first place, and provide correct guidance to the public.

INTRODUCTION

Reading has been given a greater importance in China as the Chinese government stresses the vital role of reading in national construction and personal advancement. The national reading campaign was proposed, addressing reading as the status of a national strategy in 2012. In 2019, General Secretary Xi Jinping pointed out the importance of national reading for national spirit and civic society.

The publishing industry is a vital force to promote the national reading campaign, which is not only concerned with economic profits of the industry but also literary access to achieve social benefits. Publishing organizations are to publish classic books and provide reading services in order to meet readers' needs and cultivate civilian reading habits. Besides, as information technology improves and people's reading habits change from paper reading to digital reading, the publishing industry in China is facing the transformation to digitization. Multiple publishing organizations in China take advantage of their publishing resources and actively participate in publishing convergence[1].

Based on the significant role of the publishing industry in the national reading campaign, it is essential to explore the benefits of reading, and one of the important research topics is the facilitation function of reading to improve personal well-being. Many research studies have shown the direct and indirect positive impacts of reading on individuals' subjective well-being. However, few studies explore the specific mechanisms. Furthermore, little evidence shows how digital reading impacts subjective well-being, contrasted with the boom of digital development among publishing organizations. Only a few studies explored the correlation between reading via social media and individuals' subjective well-being[2], let alone comparing the effects of different reading mediums. Many media

effects studies suggest that diverse information mediums serve various functions and gratify different social and psychological needs. For example, books best serve to know oneself; films, television and books are more concerned with enjoyment; the newspaper is associated with self-discipline[3]. Therefore, different reading mediums may elicit different effects on individuals' subjective well-being, which still lacks robust empirical evidence.

The current paper aims to develop a theoretical model to verify whether reading mediums affect subjective well-being differently and further explain why people reading more feel happier via proposing two mediating variables (loneliness and perceived fairness). As there have been relatively few studies that compare the influence on subjective well-being between different reading mediums and examine the psychological factors that mediate the impact of reading, it is worth investigating potential mediating factors between reading and subjective well-being. The study first tested the influence of reading on subjective well-being and compared the different impacts of paper reading and digital reading. The study then identified two psychological factors that may account for mediation between reading and subjective well-being and conceptualized a four-step hierarchical multiple linear regression model. The study then reported the findings based on large scale data from CGSS2017 and discussed implications for the national reading campaign and the publishing industry in China.

LITERATURE REVIEW

Subjective well-being and reading

Subjective well-being is defined as the subjective way to measure happiness[4], which is generally composed of three

parts: positive affect, negative affect and life satisfaction judgments[5]. Several investigations into the causes of subjective well-being show that income, age, gender, race, education, marriage and family, self-related health, social contact, life events and personality, are predictors of subjective well-being[6].

Previous studies have revealed that reading potentially influences subjective well-being. Reyes-Martínez et al. investigated that reading books and articles has a significant positive relationship with life satisfaction in both Latin America and Mexico[7,8]. Blessi et al. evaluated the contribution of reading novels to subjective well-being based on a survey covering the Italian population and an online survey of experts[9].

However, the previous studies rarely further distinguished reading behaviours by reading mediums. Only a few studies focused on the correlation between digital reading and subjective well-being. For instance, Fan et al. regarded digital reading as an activity for gaining information via social media and found that reading others' self-representation diminished people's subjective well-being[10]. Yang discovered that reading via social network sites has two sides, which leads to vicarious gratification to increase subjective well-being, but also induces feelings of relative deprivation to deteriorate subjective well-being[2]. According to media effects research, different information mediums play diverse functions[3]. Therefore, different reading mediums, such as paper reading versus digital reading, may affect differently subjective well-being. However, previous research mainly regarded digital reading as a specific type of media use; few studies investigated the impacts of reading mediums on subjective well-being. Therefore, there is a need to explore how different reading mediums relate to subjective well-being. The following research question was proposed.

RQ1: How do diverse reading mediums (paper reading vs digital reading) influence an individuals' subjective well-being?

The mediating role of loneliness and perceived fairness

Previous research evaluated reading's main influences on subjective well-being and explained the effect mechanisms with Bourdieu's theory of cultural capital and social comparison theory[7,8]. However, the paths of reading impacting subjective well-being are still unclear as few studies explored the possible mediating factors between reading and subjective well-being, especially lacking the investigation of these factors' roles of reading behaviours in improving subjective well-being. Therefore, this study aims to explore the specific effect mechanisms by proposing two different psychological factors that may play a role.

One of the potential contributors to influence mechanisms of reading on subjective well-being is loneliness. Loneliness is defined as the negative feeling about one's critically insufficient social network and social relationships[11]. The sense of loneliness refers to personal negative feelings about the deficience in social connections[12]. It has been verified that loneliness has a strong relationship with subjective well-being after controlling other relative variables[13]. Tu & Zhang examined the main association between loneliness and subjective well-being and found that the sense of loneliness significantly predicts life satisfaction[14]. Saygin et al. conducted a survey aimed at Turkish students and also found that loneliness is a predictor of subjective well-being[11]. Furthermore, Chen & Feeley identified that loneliness negatively affects subjective well-being via SEM[15].

Research has demonstrated that reading plays a critical role in reducing loneliness. According to the social surrogacy hypothesis, when real social activities are impossible, people turn to find temporary substitutes, which are named as social surrogates[16]. Pinker discovered that beloved books had been supposed to act as social surrogates or social snacks to potentially serve the function of indirect personal interaction and reduce feelings of loneliness[17]. Gabriel & Young found that readers resort to identification with their loving characters, build connections with symbolic groups and alleviate loneliness by providing a collective identity that is assumed and psychologically rewarding[18]. Schäfer & Eerola also found that reading allows readers to deeply absorb themselves in stories to build relationships with the narrative's reading character(s)[16]. Derrick et al. found that narratives provided by novels, television and other commonplace technologies can alleviate loneliness[19]. Hence, reading makes it possible to separate oneself from the real world and offer company simultaneously[16].

Besides satisfying individuals' social needs, reading can also help individuals gain interesting issues and anecdotes to alleviate loneliness. Pettigrew & Roberts found that reading is a good way for ageing people to kill time and mitigate emotional isolation and loneliness[20]. Toepoel demonstrated that reading as a cultural activity helps cultivate social connections and ease social isolation and loneliness[21]. Therefore, it is possible that reading could improve an individuals' subjective well-being by alleviating loneliness. The following hypotheses were proposed based on previous research and the above analysis:

Hypothesis 1a: Loneliness mediates between paper reading and subjective well-being;

Hypothesis 1b: Loneliness mediates between digital reading and subjective well-being.

Perceived fairness means the degree to perceive justice, benefits, and acknowledgement[22]. Several studies have demonstrated that perceived fairness significantly influences subjective well-being. Previous studies found that parents' and teachers' fairness promotes kids' happiness[23], and an unequal school atmosphere can reduce happiness[24]. Tortia also recognized the critical role of perceived fairness on worker well-being[25]. Alesina et al. evaluated the connection between unfairness and well-being with international data, and found that unfairness is negatively related to self-reported happiness[26]. Moreover, results from a sample of Chinese supported that the people who are perceived fairer feel greater happiness[27].

Reading symbolizes a fair opportunity for social mobility in the Chinese context. In traditional China, reading many traditional books such as The Four Books and Five Classics was an essential requirement of The Imperial Examination, which offered a fair way for the Chinese to achieve class mobility[28]. Chinese considered The Imperial Examination equal as it was based on exam grades according to individuals' accumulation of reading, not blood or family connections[29]. In other words, The Imperial Examination system requiring reading a large number of books offered an equal competitive field. Therefore, the ancestors of the Chinese regarded reading as a fair way to pass the imperial examination and achieve their ambitions. Nowadays, persuing fairness is still a vital aim in the Chinese educational assessment system[30], represented by The National College Entrance Examinations and the Graduate School Entrance Examinations, which are considered access for the

public to get a fair return on education, and it also demands people in China to read lots of professional textbooks as well as extra-curricular books. The thought that reading as a possible means for an equal way for the Chinese to achieve class mobility is still prevalent in Chinese society today. Therefore, based on the tradition of emphasizing the importance of reading to fairness in China, individuals may improve their subjective well-being by feeling a sense of fairness. The study proposed the following hypotheses:

Hypothesis 2a: Perceived fairness mediates between paper reading and subjective well-being;

Hypothesis 2b: Perceived fairness mediates between digital reading and subjective well-being.

METHODS

Data collection

The Chinese General Social Survey (CGSS2017) was used to test the above hypotheses. CGSS 2017 was conducted by Renmin University of China to explore basic demographic information, cognition and behavioural patterns of Chinese residents, adopting multi-stage stratified random sampling and covering 31 local administrative units in mainland China. The data was released in October 2020. The total number of samples for CGSS2017 was 12,582, including 783 variables. Grounding on research aims, the number of valid samples included in the analysis was 12035 after deleting missing values and extreme outliers.

Measures

Subjective well-being

Subjective well-being can be measured by an overall variable or latent variable[27]. The study measured subjective well-being with one item 'Generally how happy would you think your life is?' rated on a 5-point scale ranging from 1 (strongly unhappy) to 5 (strongly happy).

Digital reading

Digital reading was measured by asking how many ebooks participants read in the last year. The number of ebooks was increased by 1 and was taken as a natural logarithm to avoid statistical interference for extreme values.

Paper reading

Paper reading was measured by subtracting the number of ebooks from the total books an individual read.

Loneliness

Loneliness was measured using three items. Participants were asked to indicate the frequency of the following three statements: (1) How often do you feel you have lacked a companion in the past 1 month? (2) How often have you experienced isolation from others in the past 1 month? (3) How often have you felt left out in the past 1 month? The 5-point scales were anchored by 1 (never) to 5 (very often). Exploratory factor analysis showed good reliability and validity of these items (Cronbach's $\alpha = 0.876$).

Perceived fairness

Perceived fairness was measured using one item. Respondents were required to indicate the degree of fairness in China they felt through a 5-point scale. Higher scores indicate greater perceived fairness.

Control variables

Control variables concluded demographic variables and other factors that prove to influence subjective well-being, including age, gender, ethnic minorities, spouse, urban/rural, income, education level, member of the party, health conditions, interpersonal stress (Cronbach's $\alpha = 0.749$) and medical insurance. Table 1 shows the specific measurements.

Data analysis

The study firstly carried out an exploratory factor analysis (EFA) to extract two factors, loneliness and interpersonal stress. Then we conducted a four-step hierarchical multiple linear regression to answer RQ1, estimating the effects of reading mediums on subjective well-being and assessing the role of loneliness and perceived fairness between reading and subjective well-being preliminarily. Finally, the classical stepwise regression method was used to estimate the mediation effect model and examine 4 hypotheses with nonparametric bootstrap.

Table 1. Main measured variables definition.

Variable	Variable definition
Subjective well-being	Very unhappy = 1; Unhappy = 2; Cannot say happy or unhappy = 3; Happy = 4; Very happy = 5
Paper reading	The logarithm of the number of printed books read in the past year.
Digital reading	The logarithm of the number of digital books read in the past year.
Loneliness	Never = 1; Seldom = 2; Sometimes = 3; Often = 4; Very often = 5
Perceived fairness	Completely unfair = 1; Unfair = 2; Cannot say fair or unfair = 3; Fair = 4; Completely fair = 5
Age	The actual age of respondents in 2017
Gender	Male = 1; Female = 2
Ethnic minorities	Han = 1; Ethnic minorities = 0
Spouse	Yes = 1; No = 0
Urban/rural	Urban = 1; Rural = 2
Income	The logarithm of the total income in 2016
Educational level	Primary School or below = 1; Middle school = 2; High school = 3; Undergraduate = 4; Graduate = 5
Member of Communist Party of China (CPC)	Yes = 1; No = 0
Health condition	Very unhealthy = 1; Unhealthy = 2; Cannot say healthy or unhealthy = 3; Healthy = 4; Very healthy = 5
Interpersonal stress	Never = 1; Seldom = 2; Sometimes = 3; Often = 4; Very often = 5
Medical insurance	Yes = 1; No = 0

RESULTS

Exploratory factor analysis

Before testing the research question and hypotheses, the study carried out an exploratory factor analysis (EFA) to extract the latent variables: loneliness and interpersonal stress (Table 2). Firstly, Barlett's test of the first three items about loneliness (χ^2 = 7,378.726; df = 3; p < 0.001) and the last three items about interpersonal stress (χ^2 = 3,137.834; df = 3; p < 0.001) indicated that two null hypotheses are acceptable and the factor analysis is suitable to perform. The KMO values were representatively 0.703 (p = 0.000) and 0.659 (p = 0.000), confirming that variables have a high correlation and the factor analysis is adequate. Then orthogonal rotation with maximum variance method was adopted to extract principal components with eigenvalues greater than 1, the cumulative explained variance of loneliness was 80.873%, and the cumulative explained variance of interpersonal stress was 66.998%. Besides, normalized Cronbach's α values were 0.876 and 0.749. The factor load of items for loneliness were between 0.708–0.866, and the factor load of items for interpersonal stress were between 0.488–0.739, which were all greater than 0.5, indicating that the items had good validity. Therefore, two latent variables, loneliness and interpersonal stress, were extracted in this study through exploratory factor analysis.

Descriptive statistics of measured variables

This study presented basic demographic information of respondents in Table 3. In general, 47.20% of participants were male, and 52.80% were female. The average age of respondents was 51.128 years old. Of the respondents, 34.90% had an educational degree from primary school or below; 28.10% of the respondents finished middle school; 17.50% of the respondents had a degree from high school; 18.00% of respondents graduated from college; only 1.40% of the respondents had a graduate degree. Nine hundred respondents belonged to ethnic minorities, accounting for 7.48%, and most of the respondents (92.50%) belonged to China's main nationality. Most of the respondents (n = 9,355) had spouses, accounting for 77.70%. Registered urban residents were 7,625 of respondents, accounting for 63.40%, and rural residents only accounted for 36.60%. Almost all respondents had medical insurance (n = 11,211), at 93.20%. Finally, only 11.20% of respondents were Communist Party of China (CPC) members.

Besides, the mean of respondents' subjective well-being was 3.860 (SD = 0.853), above the median, indicating that respondents generally had a pretty high degree of subjective well-being. The logarithmic mean values of respondents' paper reading and digital reading were 0.218 (SD = 0.413) and 0.160 (SD = 0.369), respectively, showing that Chinese residents still need to read more and there is still a long way to go in the

Table 3. Descriptive statistics of measured variables (n = 12,035).

Measured variables	Mean	SD	Min	Max
Subjective well-being	3.86	0.853	1	5
Paper reading	0.218	0.413	0	2.7
Digital reading	0.16	0.369	0	3
Loneliness	1.774	0.85	1	8
Perceived fairness	3.1	1.065	1	5
Age	51.128	16.723	18	103
Income	3.624	1.67	0	7
Health condition	3.456	1.102	1	5
Interpersonal stress	1.634	0.753	1	8

Measured variables		N	%
Ethnic minorities	China's main nationality	11,135	92.50%
	Ethnic minorities	900	7.48%
Educational level	Primary school or below	4,197	34.90%
	Middle school	3,380	28.10%
	High school	2,111	17.50%
	Undergraduate	2,166	18.00%
	Graduate	165	1.40%
Member of China Communist Party (CPC)	Yes	1,352	11.20%
	No	10,675	88.70%
Medical insurance	Yes	11,211	93.20%
	No	824	6.80%
Spouse	Yes	9,355	77.70%
	No	2,680	22.30%
Gender	Male	5,679	47.20%
	Female	6,356	52.80%
Urban/rural	Urban	7,625	63.40%
	Rural	4,410	36.60%

promotion and popularization of the national reading campaign. The mean of respondents' loneliness was 1.774 (SD = 0.850), close to seldom feeling lonely, showing that respondents felt loneliness in low frequency. The mean of respondents' perceived fairness was 3.100 (SD = 1.065), meaning that most respondents felt that society was fair at a high level.

Multiple linear regression analysis

A four-step multiple linear regression analysis was conducted to explore the impacts of reading mediums on subjective well-being. Findings are provided in Table 4. Firstly, we tested the independence among variables with Durbin-Watson statistics. D.W. = 1.948 in our sample, meaning good independence. Furthermore, we examined multicollinearity by tolerance values and VIF., and found that the tolerance values were all above 0.1, and the VIF (Variance Inflation Factor) values were less than 10, so there was no collinearity among variables.

Model 1 in Table 4 shows the effects of control variables on subjective well-being. According to the results of regression, age, gender, spouse educational level, member of the CPC, health condition and interpersonal stress significantly influenced individuals' subjective well-being, whereas ethnic

Table 2. Results of EFA.

Items	Loneliness	Interpersonal stress
How often do you feel you lack a companion in the past month?	0.708	
How often do you feel isolated from others in the past month?	0.852	
How often have you feel left out in the past month?	0.866	
Is there any pressure from your family?		0.723
Do you feel that your family members, relatives and close friends always require too much from you?		0.739
Have important persons (e.g. your spouse, family members or close friends) felt angry or disappointed with you in the past 4 weeks?		0.548
Cumulative %	80.873	66.998

Table 4. OLS regression models of reading mediums on subjective well-being.

Measured varibles	Model 1	Model 2	Model 3	Model 4
Age	0.149(0.001)***	0.163(0.001)***	0.156(0.001)***	0.122(0.001)***
Gender	0.040(0.027)**	0.042(0.027)**	0.047(0.026)**	0.05(0.025)***
Ethnic minorities	−0.011(0.050)	−0.012(0.050)	−0.007(0.049)	−0.002(0.047)
Spouse	0.082(0.032)***	0.089(0.032)***	0.067(0.032)***	0.075(0.031)***
Urban/rural	0.024(0.031)	0.029(0.031)	0.035(0.030)*	0.019(0.029)
Income	0.022(0.000)	0.021(0.000)	0.018(0.000)	0.014(0.000)
Educational level (control: Primary school or below)				
Middle school	0.048(0.036)**	0.041(0.036)*	0.032(0.035)	0.044(0.034)*
High school	0.084(0.043)***	0.063(0.044)***	0.054(0.043)**	0.067(0.042)***
Undergraduate	0.110(0.049)***	0.068(0.052)**	0.055(0.051)*	0.065(0.049)**
Graduate	0.046(0.137)**	0.025(0.140)	0.022(0.138)	0.022(0.133)
Member of China Communist Party (CPC)	0.047(0.046)**	0.04(0.046)*	0.041(0.046)*	0.033(0.044)*
Health condition	0.251(0.013)***	0.248(0.013)***	0.223(0.013)***	0.205(0.012)***
Interpersonal stress	−0.164(0.018)***	−0.166(0.018)***	−0.121(0.018)***	−0.101(0.017)***
Medical insurance	0.014(0.051)	0.014(0.051)	0.011(0.051)	0.01(0.049)
Paper reading		0.071(0.037)***	0.069(0.036)***	0.053(0.035)**
Digital reading		0.048(0.041)**	0.042(0.041)*	0.033(0.039)*
Loneliness			−0.168(0.016)***	−0.153(0.016)***
Perceived fairness				0.261(0.012)***
Observations	3837	3837	3837	3837
Adjusted R^2	0.121	0.127	0.151	0.216

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

minorities, urban/rural, income, medical insurance were not the main factors, as the p-value of these variables were above 0.05. To be more specific, age was positively related to subjective well-being ($\beta = 0.149$, $p < 0.001$), indicating that the senior citizens feel happier. Gender was also significantly concerned with subjective well-being ($\beta = 0.040$, $p < 0.001$), meaning that females were happier than males. Spouse was positively correlated with subjective well-being ($\beta = 0.082$, $p < 0.001$), showing that individuals who had a spouse were happier than those who did not.

Moreover, the educational level positively influenced subjective well-being, and individuals who had a higher level than the primary school degree were happier than those who only finished primary school or below. Members of the CPC can also predict subjective well-being ($\beta = 0.047$, $p < 0.01$), indicating that individuals who joined CPC were happier than those who did not. Health condition was also a predictor of subjective well-being ($\beta = 0.251$, $p < 0.01$). In other words, the healthier one is, the happier he/she will be. An interesting finding was that interpersonal stress negatively affected subjective well-being ($\beta = -0.164$, $p < 0.01$), indicating that a higher level of interpersonal stress will decrease one's subjective well-being.

Variables of paper reading and digital reading were included in Model 2 to answer RQ1. In this model, control variables such as age, gender, spouse, educational level, member of the CPC, health condition, and interpersonal stress still significantly influenced individuals' subjective well-being, with p-values of these variables below 0.05. After controlling for the above variables, paper reading was positively related to subjective well-being ($\beta = 0.071$, $p < 0.001$), and digital reading also had a positive correlation ($\beta = 0.048$, $p < 0.01$). In other words, regardless of reading mediums, individuals reading more felt much happier. According to the beta values and p-values, paper reading contributed more and was more significant in statistics than digital reading. Therefore, paper reading played a more essential role in improving subjective well-being.

Considering analysis for research hypotheses, loneliness and perceived fairness possibly mediate reading on subjective well-being. Loneliness was included in Model 3 to examine H1a and H1b, and perceived fairness was included in Model 4 based on Model 3 to test H2a and H2b. Model 3 in Table 4 shows that loneliness had a negative association with subjective well-being ($\beta = -0.168$, $p < 0.001$). Meanwhile, the regression coefficient of paper reading decreased from 0.071 to 0.069. Thus, loneliness might mediate between paper reading and subjective well-being. The regression coefficient of digital reading also decreased from 0.048 to 0.042, with its p-values changed from below 0.01 to below 0.05, showing that loneliness may also play a mediation role between digital reading and subjective well-being. In other words, paper reading and digital reading indirectly motivate subjective well-being by the mediating effect of loneliness. Finally, in Model 4 in Table 4, perceived fairness positively improved subjective well-being ($\beta = 0.261$, $p < 0.001$). Meanwhile, the regression coefficient and significance of paper reading and digital reading continued to decrease. So perceived fairness may also play a mediating role for these reading two mediums.

Mediation effect test

Four-step hierarchical linear regression indicated that paper reading and digital reading affected individuals' subjective well-being partly by decreasing one's loneliness and increasing perceived fairness. To further examine how reading mediums affect subjective well-being, the study used Hayes' PROCESS macro[31] taking subjective well-being as the dependent variable, paper reading and digital reading as the independent variables, and loneliness and perceived fairness as the mediating variables. The results are shown in Table 5.

The ADE of paper reading on subjective well-being was 0.090 ($p < 0.001$), so the ADE of paper reading was significant. The mediating effects of paper reading via loneliness and perceived fairness were significant, with their estimates being 0.010 ($p < 0.01$) and 0.013 ($p < 0.001$). Therefore, loneliness and perceived

Table 5. The mediating effect of loneliness and perceived fairness (Bootstrap = 2,000).

Path	Effect	Estimate	S.E.	Est./S.E	p-value	Prop. mediated
Paper reading→Subjective well-being	Total effect	0.113	0.010	11.784	0.000	
	ACME[a]	0.023	0.004	5.248	0.000	20.35%
	Loneliness	0.010	0.003	2.999	0.003	8.85%
	Perceived fairness	0.013	0.003	4.707	0.000	11.50%
	ADE[b]	0.090	0.009	10.481	0.000	79.65%
Digital reading→Subjective well-being	Total effect	0.032(0.046)[c]	0.010	3.348	0.001	
	ACME	0.003	0.005	0.760	0.447	6.52%
	Loneliness	0.010	0.004	2.825	0.005	21.74%
	Perceived fairness	−0.007	0.003	−2.528	0.011	15.22%
	ADE	0.029	0.008	3.513	0.000	63.04%

[a] ACME means average causal mediation effects
[b] ADE means average direct effects.
[c] As there is a suppressing effect, the value of total effect (0.046) is the sum of the absolute value of ADE and indirect effects
* p < 0.05, ** p < 0.01, *** p < 0.001

fairness mediated between paper reading and subjective well-being.

In terms of impacts of digital reading on subjective well-being, ADE was 0.029 (p < 0.001), the mediating effect of digital reading via loneliness was 0.010 (p < 0.01), and the path coefficient of digital reading via perceived fairness was −0.007 (p < 0.05), in the opposite direction of the coefficient of the total indirect effect, so perceived fairness played a suppressing effect.

CONCLUSIONS AND DISCUSSION

With the publishing industries' digital transformation, digital reading is gradually overtaking paper reading to lead the new reading trend in China. Based on CGSS2017 data, this study focuses on the characteristics of different reading mediums to explore the effects of digital reading and paper reading on subjective well-being and reveal their paths of impact. The study finds that: both reading mediums have positive effects on subjective well-being, with digital reading being slightly less effective; loneliness and perceived fairness play a partially mediating role between paper reading and subjective well-being; while the impact of digital reading on subjective well-being is influenced by the mediating effect of loneliness and the suppressing effect of perceived fairness.

First, both digital reading and paper reading promote individual subjective well-being, with digital reading being weaker than traditional paper reading in terms of enhancing subjective well-being. In other words, individuals who read more books on paper or on digital media feel happier than those reading less. Therefore, the study responds to previous research and further supports evidence from previous observations that reading plays a vital role in improving individuals' subjective well-being whatever the reading medium. Also, this study further shows that diverse reading mediums have different effects on subjective well-being.

Second, loneliness and perceived fairness mediate the effects of digital reading and paper reading on subjective well-being. On the one hand, loneliness plays a mediating role between two reading mediums and subjective well-being. In other words, the first path to improve subjective well-being is that people reading paper books and ebooks can relieve the sense of loneliness. The findings further respond to previous literature on reading and subjective well-being. Reading not only reduces these lonely times but also builds a parasocial relationship with the characters of stories so that reading as a kind of social surrogate works for promoting happiness.

On the other hand, perceived fairness mediates the effect of paper reading on subjective well-being, while the situation is entirely different for digital reading which is influenced by the suppressing effect of perceived fairness, meaning that reading ebooks can reduce perceived fairness that damages subjective well-being. This study argues that digital reading leads to decreased perceived fairness, probably due to differences in digital reading content and meaning from paper reading. Paper reading is often closely associated with the pursuit of fair education in China, whereas digital reading is usually used for entertainment and information seeking, and is, therefore, less likely to generate perceptions of social fairness. Besides, compared to the traditional printed book publishing standardized process and strict review, information on digital platforms lacks regulation and tends to amplify individuals' perceptions of inequality. The results of mediating effect test that perceived fairness plays different roles for paper reading and digital reading, give a partial explanation of why digital reading is less effective than paper reading in enhancing subjective well-being.

Compared with paper-based reading, the current mechanism of the effect of digital reading on subjective well-being is less clear, which is initially explored in this paper. Previous studies on social media reading have suggested that digital reading has two sides, which can enhance subjective well-being through vicarious satisfaction, and may also produce relative deprivation and thus impair subjective well-being[2]. The present study further confirms the two-sided nature of digital reading and enriches the mechanism of action on subjective well-being.

Based on a large national random sample, this study explores the effects of different reading mediums on subjective well-being with the following theoretical contributions. First, this study explores the influence of reading mediums on subjective well-being from a cognitive perspective, which is essential to previous studies of reading mediums and enriches the established literature. Second, it enriches the mechanism of reading's effect on subjective well-being. The literature has considered reading as a form of cultural participation or leisure to enhance subjective well-being. This study further verifies the mediating effects of loneliness and perceived fairness;

meanwhile, it compares the well-being effects of paper and digital reading, and initially presents the similarities and differences between paper and digital reading in affecting subjective well-being.

This study also offers some suggestions for the national reading campaign and the development of the publishing industry. Based on the results of this study, the publishing industry should take corresponding measures to assist the national reading campaign based on the characteristics of different reading mediums, for different effects of digital reading and paper reading on subjective well-being.

First, it is necessary to promote nationwide reading and increase the amount of reading to continuously improve people's sense of happiness and meet people's desire for a happy life, which requests the publishing industry to pay attention to the publication content and publish more content and publications for the public.

Second, in terms of promotion strategies, digital reading and paper reading should be taken into account in a balanced way and it is necessary to further ramp up the publishing convergence and deploy publishing resources. In other words, the publishing industry needs to keep pace with the times to publish good quality digital books, as well as emphasize the importance of paper reading, focusing on the construction of bookstores and other offline reading platforms.

Besides, in response to the negative impacts of digital reading on perceived fairness, the publishing industry is supposed to enhance Internet content regulation and work as a gatekeeper. Publishing organizations are supposed to put the social benefits first, achieve the unification of social and economic benefits, and actively play the role to guide social trends, educate the people, serve society and boost development. Therefore, it is vital for publishing organizations to strictly check digital publishing content and focus on the correct guidance of social cognition.

The study also has some limitations. To begin with, the study measured the independent variables only via two items about printed books and ebooks and had no access to measure other types of reading content such as magazines and newspapers, which might influence the estimation of the effects of reading mediums on subjective well-being. Designing a scale measuring reading behaviours more comprehensively and roundly might be a good approach for further study. Moreover, reading frequency, reading mediums and reading types are all interesting indicators that should be considered in future research. Secondly, this study only explores two factors that mediate between reading and subjective well-being; there are other potential factors to be explored in the future. Thus, it seems necessary for future studies to find those factors and combine them in a theoretical model to find the effect of the mechanisms and how those factors work together. Lastly, the study can't avoid the endogeneity bias that subjective well-being might influence reading behaviours. In other words, the possibility does not rule out that individuals who feel happier tend to read more. Therefore, it would be necessary to explain the complex relationships via panel surveys or other research methods.

Conflict of interest

The authors declare that they have no conflict of interest.

Dates

REFERENCES

1. Yang W. 2021. Current situation research on integrated development and application of China's "Publishing+ VR/AR". *Publishing Research Quarterly* 37:317−25

2. Yang H. 2020. Do SNSs really make us happy? The effects of writing and reading via SNSs on subjective well-being *Telematics and Informatics* 50:101384

3. Katz E, Haas H, Gurevitch M. 1973. On the use of the mass media for important things. *American sociological review* 38:164−81

4. Czaja SJ, Lee CC. 2007. The impact of aging on access to technology. *Universal access in the information society* 5:341

5. Eid M, Larsen RJ (Eds.). 2008. *The Science of Subjective Well-being*. New York, USA: Guilford Press.

6. Diener E, Suh EM, Lucas RE, Smith HL. 1999. Subjective well-being: Three decades of progress. *Psychological Bulletin* 125:276−302

7. Reyes-Martínez J. 2022. Cultural Participation and Subjective Well-Being of Indigenous in Latin America. *Applied Research in Quality of Life* 17:635−54

8. Reyes-Martínez J, Takeuchi D, Martínez-Martínez OA, Lombe M. 2021. The role of cultural participation on subjective well-being in Mexico. *Applied Research in Quality of Life* 16:1321−41

9. Blessi GT, Grossi E, Sacco P, Pieretti G, Ferilli G. 2014. Cultural participation, relational goods and individual subjective well-being: some empirical evidence. *Review of Economics & Finance* 4:33−46

10. Fan X, Deng N, Dong X, Lin Y, Wang J. 2019. Do others' self-presentation on social media influence individual's subjective well-being? A moderated mediation model *Telematics and Informatics* 41:86−102

11. Saygin Y, Akdeniz S, Deniz ME. 2015. Loneliness and interpersonal problem solving as predictors of subjective well-being. *International Journal of Information and Education Technology* 5:32−35

12. De Jong Gierveld J, Van Tilburg T. 2010. The De Jong Gierveld short scales for emotional and social loneliness: tested on data from 7 countries in the UN generations and gender surveys. *European journal of ageing* 7:121−30

13. Diener, E. 2009. Subjective Well-Being. In *The Science of Well-Being*. Social Indicators Research Series. vol.37. Netherlands: Springer, Dordrecht. pp. 195−219. https://doi.org/10.1007/978-90-481-2350-6_2

14. Tu Y, Zhang S. 2015. Loneliness and subjective well-being among Chinese undergraduates: The mediating role of self-efficacy. *Social Indicators Research* 124:963−80

15. Chen Y, Feeley TH. 2014. Social support, social strain, loneliness, and well-being among older adults: An analysis of the Health and Retirement Study. *Journal of Social and Personal Relationships* 31:141−61

16. Schäfer K, Eerola T. 2020. How listening to music and engagement with other media provide a sense of belonging: an exploratory study of social surrogacy. *Psychology of Music* 48:232−51

17. Pinker S. 2021. *How the Mind Works*. Princeton University Press.

18. Gabriel S, Young AF. 2011. Becoming a vampire without being bitten: The narrative collective-assimilation hypothesis. *Psychological Science* 22:990−94

19. Derrick JL, Gabriel S, Hugenberg K. 2009. Social surrogacy: How favored television programs provide the experience of belonging. *Journal of Experimental Social Psychology* 45:352−62

20. Pettigrew S, Roberts M. 2008. Addressing loneliness in later life. *Aging and Mental Health* 12:302−9

21. Toepoel V. 2011. Cultural participation of older adults: investigating the contribution of lowbrow and highbrow activities to social integration and satisfaction with life. *International Journal on Disability and Human Development* 10:123−29

22. Choi C, Lee J, Yoo MS, Ko E. 2019. South Korean children's academic achievement and subjective well-being: The mediation of academic stress and the moderation of perceived fairness of parents and teachers. *Children and Youth Services Review* 100:22−30

23. Suldo SM, Friedrich AA, White T, Farmer J, Minch D, et al. 2009. Teacher support and adolescents' subjective well-being: A mixed-methods investigation. *School Psychology Review* 38:67−85

24. Ripski MB, Gregory. 2009. Unfair, unsafe, and unwelcome: Do high school students' perceptions of unfairness, hostility, and victimization in school predict engagement and achievement? *Journal of School Violence* 8:355−75

25. Tortia EC. 2008. Worker well-being and perceived fairness: Survey-based findings from Italy. *The Journal of Socio-Economics* 37:2080−94

26. Alesina A, Di Tella R, MacCulloch R. 2004. Inequality and happiness: are Europeans and Americans different? *Journal of Public Economics* 88:2009−42

27. Sun F, Xiao JJ. 2012. Perceived social policy fairness and subjective wellbeing: Evidence from China. *Social Indicators Research* 107:171−86

28. He W. 2012. *In the name of justice: Striving for the rule of law in China*. Brookings Institution Press.

29. Lee HC. 1985. *Government education and examinations in Sung China*. Palgrave Macmillan.

30. Song X. 2016. Fairness in educational assessment in China: Historical practices and contemporary challenges. In *Assessment in Education. Implications for Leadership*, eds. Scott S, Scott DE, Webber CF. Switzerland: Springer, Cham. pp. 67−89 https://doi.org/10.1007/978-3-319-23398-7_4

31. Hayes AF. 2017. *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach.* Guilford Publications