

## Research Article

# Exploring the Privacy Paradox in Social Network Users: A Double-Entry Mental Accounting Theory Perspective

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Social networking service (SNS) users often express great concern for their personal privacy, yet continue to disclose personal information on these platforms. This privacy paradox between privacy concerns and disclosure behavior has drawn widespread academic attention. In this study, we use the double-entry mental accounting theory to construct a theoretical model and conduct an in-depth analysis of the privacy paradox phenomenon and its causes through empirical verification. Our research shows a significant positive correlation between perceived benefits and users' intention to disclose privacy, while perceived risks and users' intention to disclose privacy are significantly negatively correlated. The double-entry mental accounting theory plays a crucial role in mediating the relationship between perceived values and users' intention to disclose privacy. Furthermore, we found that information sensitivity negatively regulates the relationship between perceived risks, the pleasure attenuation coefficient  $\alpha$ , the pain buffering coefficient  $\beta$ , and the intention to disclose privacy. Our study provides theoretical and empirical information on the reasons for the privacy paradox and offers insights for social networking service providers to optimize their services.

## 1. Introduction

In recent years, social networking service (SNS) has rapidly become an essential tool for public information exchange worldwide, thanks to its unique features and services. SNS providers leverage users' personal information to improve the level of service, but improper use of this information can lead to the disclosure of users' privacy. In 2018, Cambridge Analytica collected private information from 87 million Facebook users without their consent [1], highlighting the seriousness of privacy breaches. In theory, users may choose to reduce or avoid disclosing personal information due to fear of privacy breaches. However, in reality, users' privacy attitudes and behaviors are not synchronized, and this creates a phenomenon known as the privacy paradox [2]. On the one hand, SNS users are concerned about the security risks of privacy disclosure and hope to better protect their

personal information. On the other hand, they disclose personal information such as interests and locations on SNS platforms to obtain convenience in services.

Privacy paradox reflects the inconsistency between SNS users' privacy attitudes and behavior, which can encourage SNS providers to expand the scope of personal information collection and usage, thereby increasing the risk of privacy breaches for users. In addition, the phenomenon of privacy paradox could undermine the public support for the government's privacy protection policies, making it difficult for the government to formulate effective privacy regulation policies. Therefore, exploring the mechanism behind the privacy paradox of SNS users has important practical significance for the development of SNS and the protection of SNS users' privacy [3].

Current research mainly focuses on studying the causes of the privacy paradox of SNS users from two perspectives: individual behavior and social theory.

In terms of the individual behavior perspective, researchers mainly explain the privacy paradox phenomenon from three aspects: privacy calculus, cognitive biases, and bounded rationality. The privacy calculus theory assumes that SNS users are rational, and their privacy disclosure behavior is a type of transaction behavior. Users' disclosure behavior is due to the perception that the benefits of disclosing personal privacy outweigh the potential losses [4]. Studies by Debatin et al. [5] and Lee et al. [6] have shown that users perceive higher benefits from SNS, such as entertainment, social capital, and emotional support, than they perceive risks. Davazdahemami et al. [7] further expanded the privacy calculus theory, suggesting that information sensitivity and privacy perception control can influence people's privacy calculation process. Overly optimistic and confident cognitive biases of SNS users often have a significant impact on their privacy disclosure decisions. Most SNS users have an overly optimistic perception of privacy security and believe that the probability of privacy breaches happening to themselves is small, but the probability of it happening to others is high [8]. Kehr et al. [9] found that people's positive emotional attachment to benefits influences value judgments in decision-making, leading to overestimation of benefits and underestimation of risks, resulting in paradoxical behavior. Acquisti and Grossklags [10] believe that the privacy paradox behavior of SNS users is due to bounded rationality. SNS users need to make a decision about whether to disclose their privacy in a short period of time, leading to an incomplete evaluation of the risks and benefits and making the disclosure decision one of bounded rationality.

Based on social theory, researchers primarily explain the privacy paradox phenomenon of SNS users from two aspects. On the one hand, SNS websites are emotional communities that can meet users' social needs well [11]; even if they know the risks of privacy disclosure, people are willing to disclose in this emotional community [12]. On the other hand, people's behavior is limited by social structure. Flender and Müller [13] believed that because some people have already self-disclosed some information on social networks, based on the idea of reciprocity and pressure of social fairness, those who have not disclosed personal information are also required to disclose information. Hull's research found that not sharing personal information is seen as shameful by other users [14]. Kim and Kim believed that Facebook users mainly disclose personal information to maintain social interaction [15].

In summary, existing research has analyzed the causes of the privacy paradox from multiple theoretical perspectives, deepening our understanding of this phenomenon, but mainly explaining the privacy paradox behavior of SNS users from external factors, leaving room for improvement. For example, the social theory perspective primarily explains SNS users' privacy paradox behavior from the external social environment. The privacy calculus theory interprets SNS users' privacy disclosure behavior as a result of internal benefit-loss calculation. The theory sees the calculation process as a "black box" that outputs a result but does not explain the content of the "black box" [16]. Therefore, this

study intends to introduce the double-entry mental accounting theory, combining factors such as perceived benefits, risks, information sensitivity, and so on, to deeply explore the causes of privacy paradox behavior at the psychological level of SNS users. The research results may help to deepen the understanding of the psychological processing of SNS users' privacy decision-making and help SNS providers and regulatory agencies develop more appropriate privacy protection measures.

## 2. Theoretical Foundation and Research Hypothesis

*2.1. Double-Entry Mental Accounting Theory.* The mental accounting theory was first proposed by Thaler and has been widely applied in the fields such as consumer behavior [17, 18]. Tversky and Kahneman defined mental accounting as the cognitive process in which people encode, record, categorize, and evaluate the income and payment of wealth psychologically upon making economic decisions [19]. When making economic decisions, people often mentally group or label funds into different categories based on their sources or purposes, forming multiple mental accounts. The mental accounting system often follows a mental calculation rule that contradicts the rules of economic calculation. Thaler believes that in the process of mental calculation, people actually evaluate the costs and benefits of various choices, which is called the framing of gains and losses [20]. In this process, people pursue the maximization of emotional satisfaction rather than rational cognition of utility maximization, and emotional experience plays an important role in people's real-life decision-making. Therefore, mental accounting often influences decisions in unexpected ways, leading individuals to make decisions that violate the simplest rules of rational economic behavior [21].

In order to further explicate individuals' "prepayment preference" in consumer decision-making, Prelec and Loewenstein introduced the double-entry mental accounting theory [22]. The double-entry mental accounting is different from the "debit" and "credit" in accounting. In accounting, "debit" and "credit" record actual monetary income or payments, while the double-entry mental accounting theory believes that there are two channels in people's consumption decisions. One channel records the positive utility obtained from consumption after payment, namely, the "pleasure experienced during consumption;" the other channel records the negative utility paid to obtain benefits, namely, the "pain felt during payment" [22]. If the positive utility of consumption is greater than the negative utility of payment, people will feel that the consumption is "worth it" and "enjoyable." On the contrary, if the absolute value of the negative utility in the double-entry mental accounting is greater than the positive utility, people will feel that "this purchase is not worth it" and "I have made a bad purchase." Because this "pleasure of consumption" and "pain of payment" accompany every consumption process, the double-entry mental calculation rule affects people's consumption decisions.

To clarify the consumption-payment relationship, the double-entry mental accounting theory introduces the concept of “coupling,” which refers to the degree of closeness between consumption and payment. Two coupling coefficients,  $\alpha$  and  $\beta$ , are used to describe the tightness of the relationship between consumption and payment. The  $\alpha$  coefficient is the pleasure attenuation coefficient, which measures the degree to which the pleasure of consumption is reduced by the pain of payment. The  $\beta$  coefficient is the pain buffering coefficient, which measures the degree to which the pain of payment is offset by the pleasure of consumption. Different values of  $\alpha$  and  $\beta$  can affect people’s consumption decisions. For example, users with a small  $\alpha$  value tend to overlook costs when spending money, while customers with a small  $\beta$  value may feel regret after consuming due to the cost of payment.

Compared to consumer decision-making theories such as rational choice theory and prospect theory, the double-entry mental accounting theory focuses on the linkages and differences between consumption and payment. It examines consumers’ decision-making behaviors from a psychological perspective, offering a novel perspective to explain consumer purchasing decisions. Research in cognitive neuroscience has also provided validation for the theory of double-entry mental accounting. Studies conducted by Knutson et al. have shown that individuals exhibit immediate emotional responses to potential gains and losses, activating different neural pathways in the brain, which ultimately influences their purchasing decisions [23]. Table 1 provides a summary of the main studies conducted in recent years on the double-entry mental accounting theory. In the data-driven economy, individuals’ personal data hold monetary value and are often used as payment for “free” digital services or to obtain discounts on online products and services [31]. When users engage with social networking sites platforms, they may associate payment data currency with the services they receive and evaluate their purchase decisions based on this association. Therefore, this paper attempts to use the double-entry mental accounting theory to explain the privacy decision-making behavior of SNS users from a psychological cognitive perspective. This endeavor will contribute to our understanding of the formation of privacy paradox.

## 2.2. Research Hypotheses

*2.2.1. Perceived Value and Intention to Disclose Information.* Previous research has indicated that the decision of users to share information is often determined by the assessment of the benefits and risks associated with such sharing [32, 33]. This viewpoint parallels the definition of perceived value by Xu et al., who define it as an individual’s overall assessment of the utility of information disclosure, which is based on their perceived benefits and risks of the disclosure behavior [34]. Therefore, this paper takes perceived value as the overall outcome of the assessment of user’s perceived benefits and perceived risks. Perceived benefits refer to the anticipated gains individuals expect from information disclosure [35]. On social media platforms, the benefits perceived by users primarily include establishing new

interpersonal relationships, expanding their circle of friends [36], and the resulting sense of pleasure [37]. Previous research suggests a positive correlation between perceived benefits and users’ intention to disclose personal information [38]. Perceived risks refer to the expected losses related to the disclosure of user privacy on social networking sites, such as identity theft, being tracked, and harassment [39]. When users perceive privacy risks beyond their tolerance, they will refuse to disclose personal information [40, 41]. Therefore, we propose the following hypothesis H1:

H1: Perceived value has a significant impact on users’ intention to disclose information

H1a: Perceived benefits have a positive impact on users’ intention to disclose information

H1b: Perceived risks have a negative impact on users’ intention to disclose information

### 2.2.2. Perceived Value, Double-Entry Mental Accounting, and Intention to Disclose Privacy

*(1) Perceived Value and Mental Accounting.* The double-entry mental accounting system is influenced by users’ perceived value of goods [28]. In SNS, personalized services and other perceived benefits can increase users’ trust in SNS providers [42], which enhances the positive impact of SNS users’ mental calculations by increasing their pleasure or reducing the pain of disclosing personal data. Perceived risks such as personal data leaks and abuse may increase users’ concerns about using SNS, decrease their pleasure, or increase the pain of disclosing personal data, which can have a negative impact on users’ mental calculation processes [43]. Therefore, we propose hypothesis H2 as follows:

H2: perceived value has a significant impact on the double-entry mental accounting

H2a: Perceived benefits have a negative impact on the pleasure attenuation coefficient  $\alpha$

H2b: Perceived benefits have a positive impact on the pain buffering coefficient  $\beta$

H2c: Perceived risks have a positive impact on the pleasure attenuation coefficient  $\alpha$

H2d: Perceived risks have a negative impact on the pain buffering coefficient  $\beta$

*(2) Double-Entry Mental Accounting and Intention to Disclose Information.* In daily life, the mental accounting not only influences users’ consumption decisions but also affects their online behavior [44]. In a data-driven economy, personal data have a monetary value and are generally considered a cost for using “free” online services or products [31]. SNS users’ information disclosure behavior can be seen as a form of social exchange, where service providers gain the power to collect and process data, while users give up these rights to obtain free goods or personalized services. Since providing personal data to SNS providers can bring immediate benefits but also potentially have negative impacts

TABLE 1: Research on double-entry mental accounting.

Years	Authors	Areas	Methods	Findings
1998	Prelec and Loewenstein [22]	Economics	Theoretical	The proposal of the double-entry mental accounting theory
2006	Bernadette	Marketing	Semistructured interviews	The likelihood of users experiencing pleasure derived from purchasing goods
2011	Hoelzl et al. [24]	Marketing	Online survey	The interaction between payment mode and users' subjective evaluation of joy is present.
2013	Li et al. [25]	Marketing	Theoretical	A theoretical research framework has been proposed for the double-entry mental accounting
2014	Bi and Liu [26]	Marketing	Theoretical	A novel demand prediction model has been proposed based on the principles of the double-entry mental accounting framework
2019	Scholten et al. [27]	Management	Theoretical	The double-entry mental accounting theory provides insights into how decision-making can be influenced by the variable zero
2021	Li et al. [28]	Marketing	Questionnaire	Double-entry mental accounting plays a moderating role between residents' perceived value and WTP (willingness to pay)
2021	Wen et al. [29]	Travel	Questionnaire	The role of double-entry mental accounting in the users' decision-making process when purchasing travel packages is that of an intermediary
2022	Wu [30]	Supply chain	Theoretical	Retailers are more affected by consumers' double-entry mental accounting than manufacturers

in the future [45], the psychological process of SNS users' privacy decisions may be similar to economic decision-making, weighing the benefits gained against the costs paid and forming different mental accounts, ultimately affecting users' intention to disclose their privacy [43]. Specifically, according to the double-entry mental accounting theory, SNS users will form two accounts to record the pleasure gained from using the SNS and the pain felt when providing personal data. The connection between the two accounts will influence whether users disclose their data. When the pleasure gained from using SNS outweighs the pain felt when providing personal data, users will agree to disclose their data to use SNS, and vice versa. Therefore, we propose the following hypothesis H3:

H3: The double-entry mental accounting significantly influences users' intention to disclose information

H3a: The pleasure attenuation coefficient  $\alpha$  has a negative impact on users' intention to disclose information

H3b: The pain buffering coefficient  $\beta$  has a positive impact on users' intention to disclose information

According to the analysis mentioned above, the perceived value of SNS users' disclosure behavior will change their psychological processing, altering the users' psychological coupling coefficients  $\alpha$  and  $\beta$ . This allows the user to balance the pleasure of disclosure with potential costs to decide whether to continue disclosing information to use SNS. Therefore, perceived value affects users' intention to disclose information through the double-entry mental accounting, which acts as a mediator in the path from perceived value to information disclosure. Based on this, we propose hypothesis H4 as follows:

H4: The double-entry mental accounting acts as a mediator in the path from perceived value to users' information disclosure

H4a: The pleasure attenuation coefficient  $\alpha$  acts as a mediator in the path from perceived benefits to users' information disclosure

H4b: The pain buffering coefficient  $\beta$  acts as a mediator in the path from perceived benefits to users' information disclosure

H4c: The pleasure attenuation coefficient  $\alpha$  acts as a mediator in the path from perceived risks to users' information disclosure

H4d: The pain buffering coefficient  $\beta$  acts as a mediator in the path from perceived risks to users' information disclosure

**2.2.3. Privacy Sensitivity and Privacy Disclosure Intention.** Privacy sensitivity refers to an individual's inclination to share personal information [46]. Due to variations in personal characteristics and the importance of the information to be shared, the degree of privacy sensitivity differs from person to person [47]. Privacy sensitivity can moderate an individual's estimation of the costs and benefits of information disclosure. People who are less sensitive to privacy

concerns may consider the benefits of a service more heavily, while those who are more privacy-sensitive may consider the associated risks and factors the cost of using the service [48].

Consumer habits can affect the coupling between consumption and spending. Prelec and Loewenstein [22] argued that frugal consumers tend to be more tight-fisted in their spending behavior, focusing more on product utility and therefore appear to have a higher  $\alpha$  coefficient. In contrast, spendthrift consumers tend to be more extravagant in their spending behavior and thus appear to have a higher  $\beta$  coefficient. In this paper, we propose that privacy sensitivity also regulates individuals' mental accounts. People with high privacy sensitivity are "tightwads," taking a more cautious approach to disclose personal information, while those with low privacy sensitivity are "spendthrifts," more inclined to disclose information. Based on the aforementioned analysis, we present in this paper hypotheses H5 and H6:

H5: Privacy sensitivity plays a moderating role in the path from perceived value to users' information disclosure

H5a: Privacy sensitivity plays a moderating role in the path from perceived benefits to users' information disclosure

H5b: Privacy sensitivity plays a moderating role in the path from perceived risks to users' information disclosure

H6: Privacy sensitivity plays a moderating role in the path from double-entry mental accounting to users' information disclosure

H6a: Privacy sensitivity plays a moderating role in the path from pleasure attenuation coefficient  $\alpha$  to users' information disclosure

H6b: Privacy sensitivity plays a moderating role in the path from pain buffering coefficient  $\beta$  to users' information disclosure

The model assumed in this paper is illustrated in Figure 1. Perceived benefits and perceived risks are the independent variables, the user's intention to disclose information is the dependent variable, the double-entry mental accounting is the mediator variable, and privacy sensitivity is the moderator variable.

### 3. Research Design and Sample Analysis

**3.1. Research Design.** All variables in this paper were measured using a Likert-5 scale ranging from strongly disagree (1) to strongly agree (5). Data were collected through an online survey, which consisted of two parts. The first part included demographic information about the sample, such as age, gender, and education level. The second part measured the variables in the theoretical model. To ensure the validity of the scales used, we adapted well-established scales previously used in other studies and modified accordingly based on the content of our research.

The perceived benefits and perceived risks of users were from the scales designed by Kehr et al. [9]. In previous research, the operationalization of perceived risks was clear, while perceived benefits were not standardized [49]. Some

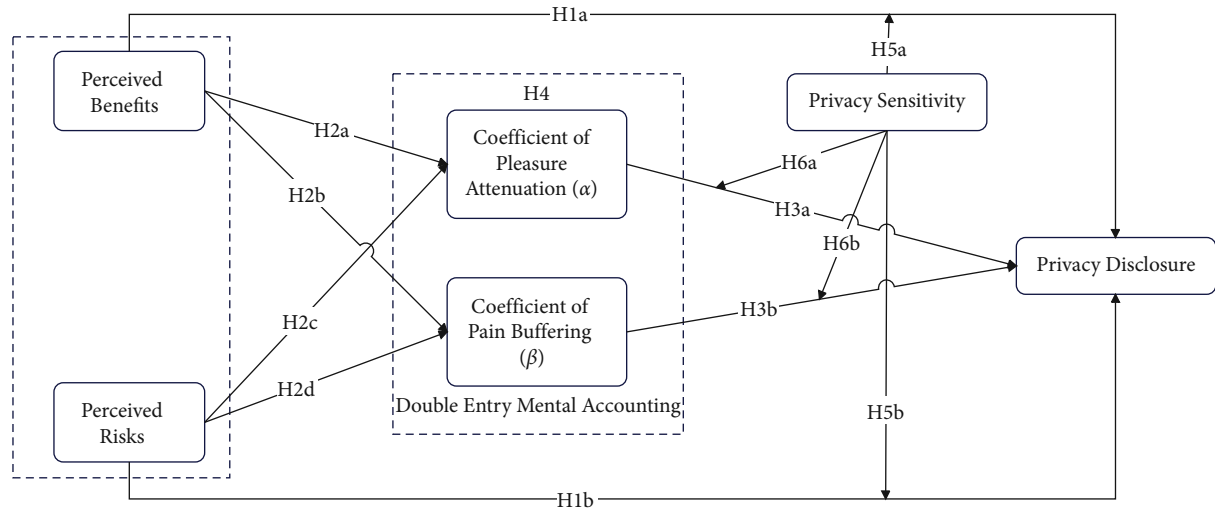


FIGURE 1: Hypothetical model.

studies have categorized perceived benefits into social benefits, financial benefits, etc. [50], with little consideration given to monetary value. This paper primarily measures perceived benefits from multiple dimensions, such as economic value, practical value, social needs, and emotional value.

The user disclosure intention was adapted from the tool created by Dienlin and Trepte [51]. The measurement of user privacy sensitivity was based on the scale developed by Xu et al. [52] and Dinev et al. [53], among others. The measurement of the double-entry mental accounting referred to the scale developed by Rick et al. [54], which included two questions: “how happy are you when using SNS?” (1 = not happy at all, 5 = very happy) and “how painful is it for you to provide personal data to SNS platforms?” (1 = not painful at all, 5 = very painful). These questions were answered by participants after completing the information disclosure-related questions and were scored in reverse, representing the  $\alpha$  coefficient and  $\beta$  coefficient, respectively.

A total of 985 questionnaires were collected in this study, and after removing invalid questionnaires, 883 valid questionnaires were obtained (89.6%). Table 2 shows the demographic information of the respondents. In the final sample, the participants’ ages were mainly distributed between 18 and 45 years old. The gender ratio in the final sample was relatively even, with 42.2% male and 57.8% female participants. Regarding educational background, 87.1% of the participants had a bachelor’s degree. In general, the demographic characteristics of the sample are more consistent with the main user group of Chinese social networking platforms [55].

**3.2. Reliability, Validity, and Factor Analysis of the Questionnaire.** In this study, we conducted an analysis of the reliability and validity of the sample data using SPSS 21.0, as shown in Table 3. First, we calculated the composite reliability (CR), Cronbach’s Alpha, and average variance extracted (AVE) to measure the reliability of the questionnaire items. If the CR value is above 0.70, the AVE value

above exceeds 0.50, and Cronbach’s Alpha value over 0.70, the reliability is considered acceptable [56]. In Table 2, all CR, AVE, and Cronbach’s Alpha values exceeded the recommended thresholds. Second, we quantified the convergent validity through the factors’ loadings. The convergent validity was satisfactory because the item loadings exceeded 0.6 [57]. Third, we evaluated the discriminant validity by comparing the square roots of AVE with the correlation coefficients between latent variables [56]. In Table 3, the bold numbers represent the square roots of AVE, which exceeded the correlation coefficients of other latent variables, meeting the criterion for discriminant validity. Finally, the Kaiser–Meyer–Olkin (KMO) values of all variables were above the standard of 0.7, indicating that the scale has good structural validity.

The AVE values of all variables are greater than 0.5, which generally indicates ideal convergent validity of the latent variables [56] and demonstrates good convergent validity of the scale. Discriminant validity is evaluated by comparing the square root of AVE with the correlation coefficients among latent variables [56]. According to Table 4, the square roots of AVE for each latent variable are greater than the correlation coefficients with other latent variables, indicating good discriminant validity of the measurement model. Reliability is mainly tested by the CR and Cronbach’s Alpha, which generally require a value of 0.7 or above to demonstrate good reliability of the measurement model [56]. As shown in Table 3, Cronbach’s Alpha and CR values for all variables are greater than 0.8, indicating good reliability of the measurement scales for all variables. In addition, the KMO of the sample data is 0.922, exceeding the standard of 0.7, and Bartlett’s test of sphericity is significant ( $p < 0.01$ ), indicating good structural validity of the measurement scales.

We used AMOS 17 to validate the structural model and conduct confirmatory factor analysis to test the overall fit of the model. As shown in Table 5, all fit indices meet the recommended criteria for model evaluation [58], indicating a good fit for the research model.

TABLE 2: Sample structure characteristics.

Item	Category	Frequency	Proportion (%)
Gender	Male	373	42.2
	Female	510	57.8
Age	18–25	340	38.5
	26–35	306	34.7
	36–45	199	22.5
	46 and above	38	4.3
Educational background	Senior high school or below	24	2.7
	Bachelor's degree	769	87.1
	Master's degree or PhD	90	10.2

TABLE 3: Reliability and validity.

Variables	Items	Items loading	AVE	CR	Cronbach's	KMO
Perceived benefits (PB)	6	0.67–0.774	0.510	0.861	0.862	0.895
Perceived risks (PR)	4	0.786–0.818	0.592	0.852	0.853	0.824
$\alpha$	4	0.731–0.831	0.586	0.849	0.849	0.804
$\beta$	4	0.754–0.824	0.595	0.853	0.852	0.806
Privacy sensitivity (PS)	5	0.697–0.796	0.587	0.876	0.876	0.868
Privacy disclosure (PD)	5	0.647–0.789	0.546	0.850	0.855	0.840

TABLE 4: The square root of AVE and correlation coefficient between potential variables.

	PB	PR	$\alpha$	$\beta$	PS	PD
Perceived benefits (PB)	0.714					
Perceived risks (PR)	-0.207**	0.769				
$\alpha$	-0.400**	0.319**	0.765			
$\beta$	0.300**	-0.255**	-0.288**	0.771		
Privacy sensitivity (PS)	0.490**	-0.273**	-0.405**	0.415**	0.766	
Privacy disclosure (PD)	0.400**	-0.383**	-0.411**	0.522**	0.524**	0.738

Note. The diagonal elements are the square roots of AVEs, and off-diagonal elements are correlations between constructs. \*\* $p < 0.01$ .

TABLE 5: Evaluation of model goodness-of-fit.

Measures	Recommended value	Measurement model
$\chi^2/df$	$\leq 5.00$	2.334
Goodness of fit index (GFI)	$\geq 0.90$	0.951
Adjusted goodness of fit index (AGFI)	$\geq 0.90$	0.939
Comparative fit index (CFI)	$\geq 0.90$	0.969
Normed fit index (NFI)	$\geq 0.90$	0.947
Incremental fit index (IFI)	$\geq 0.90$	0.969
Tucker-Lewis index (TLI)	$\geq 0.90$	0.964
RMSEA	$\leq 0.05$	0.039

## 4. Results

**4.1. The Impact of Perceived Value.** Table 6 shows the Pearson correlation coefficients between the variables. Perceived benefits ( $M = 3.80$ ,  $SD = 0.79$ ) and intention to disclose privacy have a positive correlation ( $p < 0.01$ ), indicating that the higher the perceived benefits, the higher the users' intention to disclose their privacy. Perceived risks ( $M = 2.75$ ,  $SD = 0.94$ ) and intention to disclose privacy have a negative correlation ( $p < 0.01$ ), indicating that the greater the perceived risks, the lower the users' intention to disclose their privacy.

The pleasure attenuation coefficient  $\alpha$  ( $M = 2.39$ ,  $SD = 0.80$ ) has a negative correlation with the intention to disclose privacy ( $p < 0.01$ ), which means that the smaller the  $\alpha$ , the happier the SNS users are, and the stronger their intention to disclose information. The pain buffering coefficient  $\beta$  ( $M = 3.69$ ,  $SD = 0.811$ ) has a positive correlation with the intention to disclose privacy ( $p < 0.01$ ), which means that the higher the  $\beta$ , the less painful it is for SNS users to disclose their personal data, and the more willing they are to disclose information.

Table 7 and Figure 2 show the results of the path analysis of the hypothetical model. The standardized path coefficient from perceived benefits to disclosure intention is 0.202

TABLE 6: Correlation coefficients among variables.

	PB	PR	$\alpha$	$\beta$	PD
Perceived benefits (PB)	1				
Perceived risks (PR)	-0.207**	1			
$\alpha$	-0.400**	0.319**	1		
$\beta$	0.300**	-0.255**	-0.288**	1	
Privacy disclosure (PD)	0.400**	-0.383**	-0.411**	0.522**	1

\*\* $p < 0.01$ .

TABLE 7: Model path analysis result.

Hypothetical	Path	Path coefficient	Significance	Hypothesis testing
H1a	PB-->privacy disclosure	0.202	$p < 0.001$	Support H1a
H1b	PR-->privacy disclosure	-0.212	$p < 0.001$	Support H1b, H1
H2a	Perceived benefit--> $\alpha$	-0.391	$p < 0.001$	Support H2a
H2b	Perceived benefit--> $\beta$	0.293	$p < 0.001$	Support H2b
H2c	Perceived risks--> $\alpha$	0.288	$p < 0.001$	Support H2c
H2d	Perceived risks--> $\alpha$	-0.238	$p < 0.001$	Support H2d, H3
H3a	$\alpha$ -->privacy disclosure	-0.147	$p < 0.001$	Support H3a
H3b	$\beta$ -->privacy disclosure	0.412	$p < 0.001$	Support H3b, H3

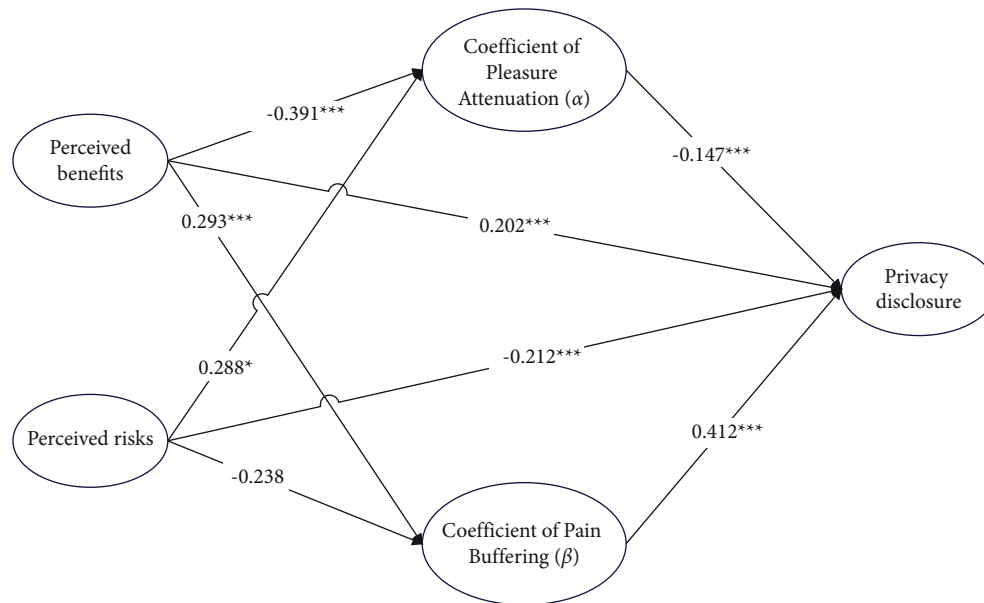


FIGURE 2: Model path analysis.

( $p < 0.001$ ), indicating a significant positive correlation between perceived benefits and disclosure intention, validating hypothesis H1a. The standardized path coefficient from perceived risks to disclosure intention is  $-0.212$  ( $p < 0.001$ ), indicating a significant negative correlation between perceived risks and disclosure intention, validating hypothesis H1b. Therefore, perceived value has a significant impact on disclosure intention, and hypothesis H1 is validated.

The standardized path coefficient from perceived benefits to the pleasure attenuation coefficient  $\alpha$  is  $-0.391$  ( $p < 0.001$ ), and the standardized path coefficient to the pain buffering coefficient  $\beta$  is  $0.293$  ( $p < 0.001$ ). The results show that perceived benefits have a significant negative impact on the pleasure attenuation coefficient  $\alpha$  and a significant

positive impact on the pain buffering coefficient  $\beta$ . Therefore, when users perceive more benefits of SNS, the degree of pleasure attenuation when using SNS will decrease, and the pain reduced by the joy of SNS will increase, validating hypotheses H2a and H2b.

The standardized path coefficient from the pleasure attenuation coefficient  $\alpha$  to disclosure intention is  $-0.147$  ( $p < 0.001$ ), indicating a negative correlation between the two. When the pleasure of using SNS is significantly reduced due to the pain of disclosing personal information, users are less willing to disclose their information, validating hypothesis H3a. The standardized path coefficient from the pain buffering coefficient  $\beta$  to disclosure intention is  $0.412$  ( $p < 0.001$ ), indicating a significant



TABLE 8: The results for indirect effects of perceived value and double-entry mental accounting on disclosure intention.

Indirect effects	Estimate	LLCI	ULCI	P
Perceived benefits- $\alpha$ -intention of disclosure	0.058	0.026	0.096	0.001
Perceived benefits- $\beta$ -intention of disclosure	0.120	0.085	0.166	0.001
Perceived risks- $\alpha$ -intention of disclosure	-0.042	-0.075	-0.018	0.001
Perceived risks- $\beta$ -intention of disclosure	-0.098	-0.138	-0.066	0.001

positive correlation between the two. When the pain of disclosing personal information is greatly alleviated by the pleasure of using SNS, users are more willing to disclose their information, validating hypothesis H3b. Therefore, the double-entry mental accounting has a significant impact on users' information disclosure intention, validating hypothesis H3.

#### 4.2. Mediating Effect of Double-Entry Mental Accounting.

In this paper, we used bootstrapping, as proposed by Preacher and Hayes, and AMOS 26.0 software, to analyze the mediating effects of the double-entry mental accounting. The mediation effect is significant only when the indirect effect of the mediator variable is significant [59]. We drew a sample of 2,000 cases to test the indirect effects of the double-entry mental accounting on information disclosure intention, using a 95% confidence interval. If the confidence interval (with upper limit and lower limit of confidence level denoted as ULCI and LLCI, respectively) does not include 0, the effect is significant; otherwise, it is not significant.

Table 8 shows the indirect effects of the double-entry mental accounting on the path from perceived value to information disclosure intention. It can be observed that when the pleasure attenuation coefficient  $\alpha$  is a mediator variable, the confidence interval for the indirect effect of perceived benefits on information disclosure intention is [0.026, 0.096], and the confidence interval for the indirect effect of perceived risks on information disclosure intention is [-0.075, -0.018]. Both confidence intervals pass the 5% level of significance test, indicating that the mediating effects exist, and thus, hypotheses H4a and H4c hold. When the mediator variable is the pain buffering coefficient  $\beta$ , the confidence interval for the indirect effect of perceived benefits on information disclosure intention is [0.085, 0.166], and the confidence interval for the indirect effect of perceived risks on information disclosure intention is [-0.138, -0.066]. Both confidence intervals pass the 5% level of significance test, indicating that the mediating effects exist, and thus, hypotheses H4b and H4d hold. Therefore, the double-entry mental accounting plays a mediating role between perceived value and information disclosure intention. Thus, hypothesis H4 holds.

**4.3. Moderating Effect of Privacy Sensitivity.** We used Baron and Kenny's hierarchical multiple regression analysis to test the moderating effect of privacy sensitivity on the intention of SNS users to disclose information [60]. The hierarchical multiple regression method establishes two multiple regression models to test the moderating effect of

variables. The first model introduces independent variables and moderator variables to determine the explanatory power of the model; the second model introduces independent variables, moderator variables, and their interaction terms. If the regression coefficient of the interaction term is significant, it indicates that the moderator variable has a significant moderating effect on the relationship between the independent and dependent variables.

In practice, we first tested the moderating effect of privacy sensitivity on the relationship between perceived benefits and the intention to disclose information. The results of model 2 in Table 8 indicate that the regression coefficient of the interaction term between perceived benefits and privacy sensitivity is  $-0.274$  ( $t = -1.567$ ,  $P = 0.118 > 0.05$ ), indicating that the interaction term is not significant on the intention to disclose information. Privacy sensitivity does not have a moderating effect on the perceived benefits and the intention to disclose information, so hypothesis H5a does not hold.

This article examines the moderating effect of privacy sensitivity between perceived risks and intention to disclose information. The results from model 4 in Table 9 demonstrate that the regression coefficient of the interaction term between perceived risks and privacy sensitivity is  $0.401$  ( $t = 3.149$ ,  $P < 0.05$ ), indicating that the interaction term is significant on the intention to disclose information. This finding suggests that privacy sensitivity plays a significant role in moderating perceived risks and intention to disclose information. Thus, hypothesis H5b holds. Figure 3 displays the moderating effect of privacy sensitivity on perceived benefits and intention to disclose information. Specifically, privacy sensitivity possesses a negative moderating effect. When privacy sensitivity is low, the negative relationship between perceived risks and intention to disclose information is stronger.

Third, this study examines the moderating effect of privacy sensitivity between the pleasure attenuation coefficient  $\alpha$  and intention to disclose information. The results from model 2 in Table 9 show that the regression coefficient of the interaction term of the pleasure attenuation coefficient  $\alpha$  and privacy sensitivity is  $0.658$  ( $t = 6.210$ ,  $P < 0.05$ ), indicating that the interaction term has a significant impact on intention to disclose information. This finding suggests that privacy sensitivity plays a significant moderating role between the pleasure attenuation coefficient  $\alpha$  and intention to disclose information, which indicates that hypothesis H6a holds. Figure 4(a) illustrates that the privacy sensitivity negatively moderates the relationship between the pleasure attenuation coefficient  $\alpha$  and their intention to disclose information.

TABLE 9: The result for moderating effect of privacy sensitivity on perceived value and information disclosure intention.

	Model 1	Model 2	Model 3	Model 4
Perceived benefits (PB)	0.188***	0.338***		
Perceived risks (PR)			-0.259***	-0.627***
Privacy sensitivity (PS)	0.432***	0.595***	0.453	0.184
PB × PS		-0.274		
PR × PS				0.401**

\*\*  $p < 0.01$ ; \*\*\*  $p < 0.00$ .

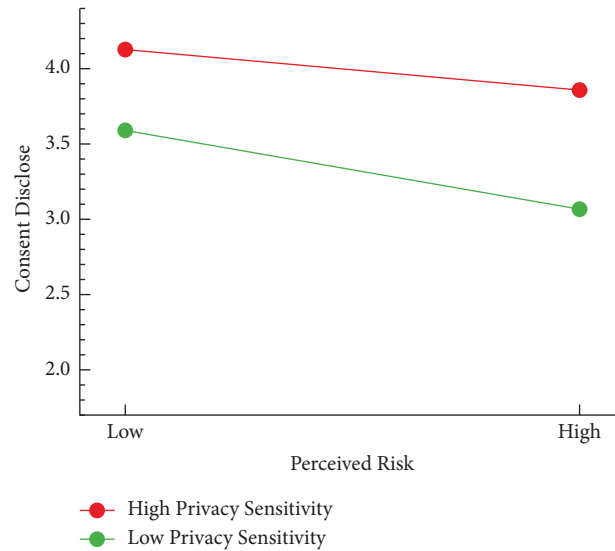


FIGURE 3: Moderating effect of privacy sensitivity on perceived value and information disclosure intention.

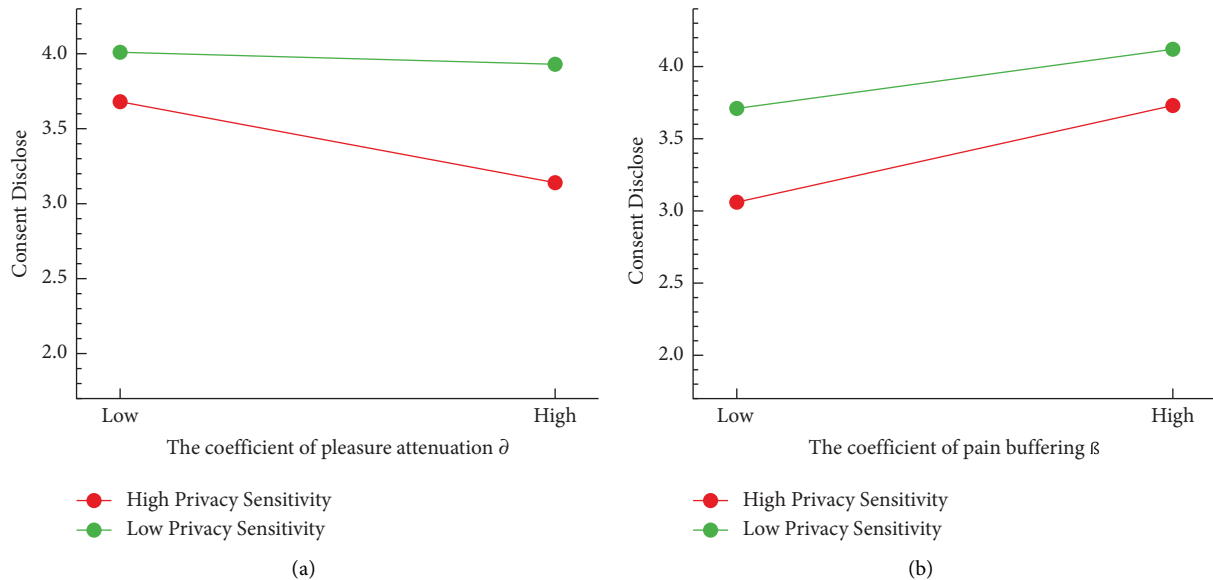


FIGURE 4: Moderating effect of privacy sensitivity on double-entry mental accounting and information disclosure intention. (a) The coefficient of pleasure attenuation  $\alpha$ ; (b) the coefficient of pain buffering  $\beta$ .

Finally, this study examines the moderating effect of privacy sensitivity between the pain buffering coefficient  $\beta$  and intention to disclose information. The results from

Model 4 in Table 10 show that the regression coefficient of the interaction term between the pain buffering coefficient  $\beta$  and privacy sensitivity is  $-0.521$  ( $t = -2.937$ ,  $P < 0.05$ ),

TABLE 10: The result for moderating effect of privacy sensitivity on double-entry mental accounting and information disclosure intention.

	Model 1	Model 2	Model 3	Model 4
The pleasure attenuation coefficient $\alpha$	-0.239***	-0.881***		
The pain buffer coefficient $\beta$			0.368***	0.689***
Privacy sensitivity (PS)	0.427***	-0.076	0.372***	0.662***
$\alpha \times PS$		0.658***		
$\beta \times PS$				-0.521**

\*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

indicating that the interaction term has a significant impact on intention to disclose information. This finding suggests that privacy sensitivity plays a significant moderating role between the pain buffering coefficient  $\beta$  and intention to disclose information, which means that hypothesis H6b holds. Figure 4(b) illustrates the negative moderating effect of privacy sensitivity. Specifically, when privacy sensitivity is low, the positive relationship between the pain buffering coefficient  $\beta$  and intention to disclose information is stronger.

## 5. Discussion and Conclusion

*5.1. Theoretical Implications.* Based on the theory of double-entry mental accounting, this study focuses on the intrinsic mechanism of information disclosure by SNS users. A total of 883 valid research data were collected through a questionnaire survey, and the measurement model showed good reliability and validity. Most of the hypotheses proposed in the study were verified.

The analysis results showed that perceived value significantly influences the information disclosure intention of SNS users, which is consistent with previous research results [40, 50]. This indicates that the risk-benefit trade-off of privacy disclosure influences the intention of SNS users to disclose information. The benefits that social networks bring to users, such as acquiring social capital and experiencing positive emotions, will enhance the intention of social network users to disclose information. Perceived risks related to information disclosure, such as privacy breaches and abuse, will reduce the information disclosure intention of SNS users.

Second, an important finding of this study is that the double-entry mental accounting theory has a significant mediating effect between perceived value and disclosure intention in SNS users. Previous studies have shown that mental accounts influence users' perception of risks and benefits and their disclosure behavior [44, 45]. This study found that the risks-benefits calculations of SNS users are influenced by double-entry mental accounting, users' perceived benefits and perceived risks are recorded in the "pleasure of using SNS" and "pain of disclosure" accounts, respectively. The degree of coupling between them changes users' perceived benefits and risks, thereby affecting SNS users' disclosure intention. In addition, an interesting finding of this study is that the mediation effect of the pain buffering coefficient  $\beta$  is higher than that of the pleasure attenuation coefficient  $\alpha$ . Kamleitner's research suggests that when purchasing essential goods, users have a higher  $\beta$  [61]. As essential goods provide utility that lasts for a longer duration after purchase (such as washing machines),

individuals experience greater consumption pleasure, thereby resulting in a larger beta coefficient. Approximately, 70% of American adults use various social media platforms, with SNS becoming a necessity in people's lives. The psychological processes involved in sharing information on SNS and purchasing essential goods exhibit similarities. When users are able to disregard costs and engage in extravagant spending, they easily forget the pain of payment during consumption, resulting in a larger beta coefficient [22]. Similarly, in terms of information sharing, SNS users who do not value privacy are evidently more prone to forgetting the discomfort of sharing personal information.

Third, this study analyzed the moderating effect of privacy sensitivity on the psychological processing of SNS users' information disclosure. The results showed that privacy sensitivity has a significant moderating effect on the path from perceived risks to disclosure intention and the path from double-entry mental accounting to disclosure intention. When privacy sensitivity is low, perceived risks and the pleasure attenuation coefficient  $\alpha$  are strongly negatively correlated with disclosure intention, while the pain buffering coefficient  $\beta$  is strongly positively correlated with disclosure intention.

On the whole, our research provides a new theoretical perspective for understanding the phenomenon of the privacy paradox. The risk-reward trade-off is the primary perspective for explaining the privacy paradox. Our research findings further explore the psychological processes of risk-benefit trade-offs among SNS users, providing new insights for future studies.

*5.2. Policy Implication.* The findings of this study are relevant for both social networking service (SNS) providers and public policymakers. First, SNS providers should to acknowledge that consumers make privacy disclosure decisions through a cost-benefit analysis. When users provide personal information in exchange for substantial personalized advantages, resulting in an enhanced satisfaction with their online experience, their privacy concerns might be alleviated [62]. Consequently, SNS providers could leverage data analytics to offer more customized services that align closely with consumer demands, securing a competitive edge. Additionally, providers should implement measures to build user trust regarding the rightful use of their data, such as clear communication about data tracking times, frequency, and transfer methods [63].

Furthermore, with double-entry mental accounting acting as a notable mediating force within SNS users' privacy decision-making, altering the coefficients  $\alpha$  and  $\beta$  in such

accounts can substantially commend the disclosure of information. Marketing studies suggest that tactics like bundling, coupon distribution, and gift-giving can influence the coefficients within a consumer's mental accounts [18]. Hence, SNS providers might employ similar promotional mechanisms to encourage information sharing, such as allowing nonregistered post-viewing and gathering less sensitive information for personalized services [64].

Lastly, policymakers are integral in diminishing the discrepancy between users' privacy concerns and their actual practices. The study implies that personal psychological factors heavily influence SNS users' disclosure choices, hinting that some might struggle to equate the benefits and costs associated with data sharing. By enacting and refining appropriate legislations, policymakers can facilitate fair and standardized information practices between users and businesses. The implementation of strict privacy laws such as the general data protection regulation (GDPR) has compelled SNS providers towards greater transparency, while granting users increased data control [65]. Additionally, privacy awareness is fostered by GDPR's introduction [66]. Privacy education and public debates are recognized strategies for mitigating the privacy paradox [65, 67], and therefore, enhancing privacy education and catalysing public discussion could serve as feasible interventions. In conclusion, privacy underpins the very fabric of individual and societal welfare and mandates active societal collaboration for its sustenance.

**5.3. Limitations and Future Research Directions.** This study also has some limitations that need to be addressed in future research. First, the data for this study were collected from China, and it has been suggested that users' information disclosure behavior is influenced by cultural factors [68]. Therefore, future research is necessary to test whether these findings hold true in the United States, Europe, and other Asian countries. Second, according to the double-entry mental accounting theory, individual characteristics such as consumer habits and self-control can affect the linkage of mental accounting. In subsequent studies, this paper will further consider the impact of personal characteristics, such as users' attitude towards privacy, on the linkage of mental accounting in information disclosure behavior.

### Data Availability

Data sharing is not applicable. The data are not publicly available due to participants' privacy.

### Conflicts of Interest

The authors declare that they have no conflicts of interest.

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